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PC WORLD

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Technically speaking, the Dell System® 325 is the most advanced 386™ computer we've ever built. And, according to PC Magazine, it's one of the most advanced 386 computers they've ever tested.

In benchmark after benchmark, the 25 MHz Dell System 325 ran circles around a field of 386-based system . A field that included the Compaq® 386/25.

A show of prowess that earned the System 325 PC Magazine's Editor's Choice award.

It was a goal we set for ourselves from the very beginning. And an objective anyone with a penchant for power and performance can appreciate.

THE FIRST PERSONAL COMPUTER THAT'S REALLY PERSONAL.

Of the more than 150,000 personal computers we've sold to date, each one has been individually configured to fit the needs of its owner.

The System 325 takes that idea to its logical extreme.

For example, it runs either MS-DOS,® MS® OS/2, or our own Dell UNIX® System V. Which is compatible with AT&T's System V Interface Definition. And the world of XENIX® applications.

If speed is of the essence, we can include an optional Intel® 80387 or WEITEK 3167 math coprocessor. And since nothing about this system is lightweight, the standard mass storage is a 100 MB hard disk drive. Or we can configure it with a 40, 150 or 322 MB hard drive.

As you might expect, the output is just as intense. You can choose between VGA mono-chrome with

THE DELL 386 SYSTEM 325 HAS A 25 MHz CLOCK RATE, CACHE MEMORY CONTROLLER, IDE OR ESDI HARD DISK DRIVE, PAGE MODE INTERLEAVED MEMORY, AND 100% COMPATIBILITY WITH MS-DOS, OS/2 AND UNIX SYSTEM V.

paper-white screen, VGA Color Plus, or Super VGA for high resolution colors displayed on a larger screen.

Even though the 325 gives you all this performance, it still leaves you six open slots for whatever else you might want to add.

And once you've told us what you want, we'll make sure what you want works—by burning-in the entire system unit.

COMPUTER RETAILERS ARE NO KNOWS.

There are some good reasons computer retailers won't know much about the System 325.

First, with all the new and increasingly sophisticated systems they have to keep up with on a daily basis, you can hardly expect them to know everything.

Second, because Dell sells direct.

Which means you now have the unique opportunity to talk directly with the people who make them. And ask things like, "What is page mode interleaved memory?" or, "How much SIMM RAM should I add?"

In other words, the kinds of details that are important to people who make computers and people who use them.

So dealing direct not only can save you up to the 35% mark-up, but 100% of the frustration.

WE COME WHEN WE'RE CALLED.

One of the things that very clearly sets Dell systems apart from other computers is not just how they're sold but how they're supported.

Overkill was one description used in a recent PC Week article.

Perhaps.

But then, we think you'll agree, when something goes wrong, you want as much help as possible, right?

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Which is why every Dell system comes with a toll-free technical support line and self-diagnostic software. We're able to solve 90% of all problems right over the phone. The other 10% receive next-day, deskside service. Thanks to our new alliance with Xerox Corporation.

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As you've probably guessed, one of the things that drives us most is customer satisfaction.

So we'd like to give you the ultimate guarantee:

Try a System 325 in your office for a month. Run your toughest applications. Put it through its paces, at your pace. If you're not completely satisfied, send it back anytime within 30 days. And we'll refund your money.

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Whether you need a single computer, or an entire office full, there is a leasing plan for your business that is just like 100% financing.

And just as we can custom configure your computers, we can see to it you get a custom designed lease plan to fit your exact business needs.† A fact that has not gone unnoticed. Especially by the Fortune 500. Over half of whom now own or lease Dell systems.

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That's the part we like best.

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SO HOW COME YOU NEVER CALL?

PC MAGAZINE EDITOR'S CHOICE

"The new top-of-the-line Dell System 325 is a flagship worth putting out in front of the fleet."

February 14 1989

THE DELL SYSTEM® 310
20 MHz 386

The best combination of performance and value available in its class.

STANDARD FEATURES:

- Intel 80386 microprocessor running at 20 MHz.
- Choice of 1 MB, 2 MB, or 4 MB of RAM* expandable to 16 MB (using a dedicated high-speed 32-bit memory slot)
- Advanced Intel 82385 Cache Memory Controller with 32 KB of high speed static RAM cache.
- Page mode interleaved memory architecture.
- VGA systems include a high performance 16-bit video adapter.
- Socket for 20 MHz Intel 80387 or 20 MHz WEITEK 3167 math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Dual diskette and hard drive controller.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 200-watt power supply
- 8 industry standard expansion slots (6 available).

***Lease for as low as $135/month.*
△ Extended Service Plan pricing starts at $251.

40 MB TTL Monochrome System	$3,699
40 MB VGA Color Plus System	$4,199
100 MB VGA Color Plus System	$4,699
100 MB Super VGA Color System (800x600)	$4,799

Prices reflect 1 MB of RAM. 150 and 322 MB configurations also available.

THE DELL SYSTEM® 316
16 MHz 386SX.™

Expandable, affordable access to 386 architecture.

STANDARD FEATURES:

- Intel 80386SX microprocessor running at 16 MHz.
- Choice of 1 MB, 2 MB, or 4 MB of RAM* expandable to 16 MB (8 MB on the system board).
- Page mode interleaved memory architecture.
- VGA systems include a high performance 16-bit video adapter.
- LIM 4.0 support for memory over 1 MB.
- Socket for 16 MHz Intel 80387SX math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Integrated high performance hard disk drive interface and diskette controller on system board. (ESDI based systems include a hard disk controller.)
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 200-watt power supply.
- 8 industry standard expansion slots (7 available).

***Lease for as low as $98/month.*
△ Extended Service Plan pricing starts at $234.

40 MB TTL Monochrome System	$2,699
40 MB VGA Color Plus System	$3,199
100 MB VGA Color Plus System	$3,799
100 MB Super VGA Color System (800x600)	$3,899

Prices reflect 1 MB of RAM. 150 and 322 MB configurations also available.

THE DELL SYSTEM® 220
20 MHz 286.

It's faster than many 386 computers. But selling for much less. The footprint is small, too.

STANDARD FEATURES:

- 80286 microprocessor running at 20 MHz.
- Choice of 1 MB, 2 MB, or 4 MB of RAM* expandable to 16 MB (8 MB on system board).
- Page mode interleaved memory architecture.
- LIM 4.0 support for memory over 1 MB.
- Integrated diskette and VGA video controller on system board.
- Socket for Intel 80287 math coprocessor.
- One 3.5" 1.44 MB diskette drive.
- Integrated high performance hard disk interface on system board.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports (integrated on system board).
- 3 full-sized 16-bit AT expansion slots available.

***Lease for as low as $109/month.*
△ Extended Service Plan pricing starts at $264.

40 MB VGA Monochrome System	$2,999
40 MB VGA Color Plus System	$3,299
100 MB VGA Monochrome System	$3,599
100 MB VGA Color Plus System	$3,899

Prices reflect 1 MB of RAM. External 5.25" 1.2 MB diskette drive available.

THE NEW DELL SYSTEM® 210
12.5 MHz 286.

The price says this is an entry-level system. The performance says it's a lot more.

STANDARD FEATURES:

- Intel 80286 microprocessor running at 12.5 MHz.
- 512 KB, 640 KB,†† 1 MB, or 2 MB of RAM expandable to 16 MB (using 6 MB on system board).
- Socket for Intel 80287 math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Integrated diskette and high performance 16-bit VGA video controller on system board.
- LIM 4.0 support for memory over 1 MB.
- Page mode interleaved memory architecture.
- Integrated high performance hard disk interface on system board.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 3 full-sized 16-bit AT expansion slots available.

***Lease for as low as $64/month.*
△ Extended Service Plan pricing starts at $190.

20 MB VGA Monochrome System	$1,699
20 MB VGA Color Plus System	$1,999
40 MB VGA Monochrome System	$1,899
40 MB VGA Color Plus System	$2,199

Prices reflect 512 KB of RAM.
††640 KB versions of the above systems are available for an additional $80.
100 MB configurations also available.

**Performance Enhancements (Systems 325, 310, 316 and 220): within the first megabyte of memory, 384 KB of memory is reserved for use by the system to enhance performance. 4 MB configurations available on all systems. Call for pricing.*

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When you need a truly high-performance 386 computer, this is it.

STANDARD FEATURES:

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- Choice of 1 MB, 2 MB or 4 MB of RAM* expandable to 16 MB (using a dedicated high-speed 32-bit memory slot).
- Advanced Intel 82385 Cache Memory Controller with 32 KB of high speed static RAM cache.
- Page mode interleaved memory architecture.
- VGA systems include a high performance 16-bit video adapter.
- Socket for 25 MHz Intel 80387 or 25 MHz WEITEK 3167 math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Dual diskette and hard drive controller.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 200-watt power supply.
- 8 industry standard expansion slots (6 available).

***Lease for as low as $199/month.*
△ Extended Service Plan pricing starts at $370.

40 MB VGA Monochrome System	$5,499
100 MB VGA Color Plus System	$6,299
100 MB Super VGA Color System (800 x 600)	$6,399
150 MB Super VGA Color System (800 x 600)	$6,899

Prices reflect 1 MB of RAM. 322 MB configurations also available.

All systems are photographed with optional extras.

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PC WORLD

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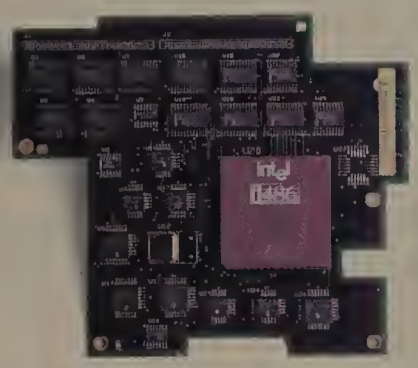

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PC MAGAZINE
EDITORS' CHOICE
July 1989
VGAWONDER

PC WORLD
BEST BUY

VGAWONDER

FASTER THAN THE AVERAGE BEAR

Are you asking yourself what a bear has to do with super speed, remarkable resolution and fabulous colors? We did, too. How can anyone bear to work with less than incredible speed, we asked ourselves. How can anyone bear to work without extraordinary resolution? Bear to work with less than 256 spectacular colors? We got so beared out, we decided to share one with you. Along with the bear facts about ATI's award-winning board.

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Out of the Blue

Senior Editor Eric Knorr, ready to hit the road with IBM's Best Buy PS/2 Model P70

ROBERT CARDIN

What on earth has gotten into IBM? Plenty, to judge by the amount of coverage Big Blue earns in this issue. Lately, the giant from Armonk has found itself playing technology leader to the PC industry. East Coast Editor Eric Bender covers that beat: This month's preview of IBM's 486 upgrade board ("IBM Kicks Off the 486 Race") and our in-depth feature on the *OfficeVision* family of applications ("Organizing the Global Office") bear his byline.

But the biggest IBM story this month is that Senior Editor Eric Knorr has finally found a PS/2 worth raving about. The 20-MHz, 386-based, transportable PS/2 Model P70 is a winner, he reports. "The gas-plasma VGA display is the best you can get in any transportable today. People who scoffed at the PC Convertible's display will be amazed. And the pricing is great. If you configure a desktop Model 70-121 and a Model P70 identically, the portable costs $2000 less!"

Another forward-thinking touch: The Model P70's minimum memory configuration is 4MB, room enough to run OS/2. Technical Editor Karl Koessel calls the system "the best desktop machine IBM ever built—who cares that it's in a transportable package?" He suggests that Big Blue's ability to supply its own cheap RAM may account for the aggressive pricing.

Cutting-edge technology and a great price —are these the first signs of a new IBM? Don't get your hopes up just yet, Knorr warns. "While it's a great value, the P70 is a winner in a shrinking area of mobile computing: big, heavy, powerful, AC-powered boxes. The real future is in powerful, battery-driven laptops, and whether IBM can turn out a contender remains to be seen."

If the Model P70 were a desktop machine, it would take its lumps for subpar performance and limited expandability. But Big Blue's engineers instead transferred their desktop technology to the luggable format, where tradeoffs in performance and expandability come with the territory, says Knorr. The result? "What would be mediocre performance in a desktop system translates into a very fast transportable."

So, is the Model P70 a happy accident—or the first in a streak of crowd-pleasing PS/2s? We'd prefer to think that new president James A. Cannavino has infused IBM's PC division with the competitive drive needed to regain its role as a leader in PC technology. If that's the case, maybe we won't be so surprised the next time we see an IBM system with power and a fair price tag. ●

Ed Bott

Ed Bott
Managing Editor

House.

Senate.

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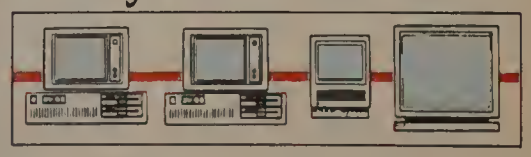

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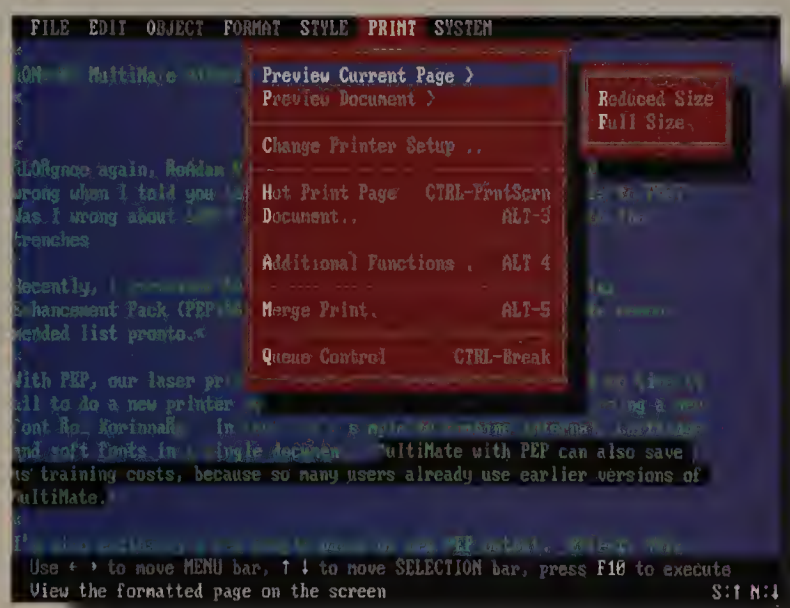
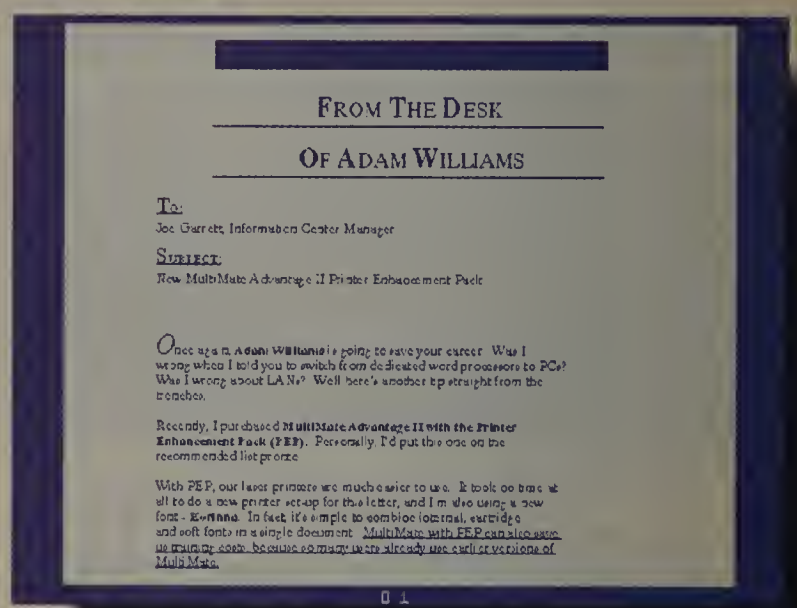


Complete pull-down menus with lightbar select make the easiest word processor even easier.



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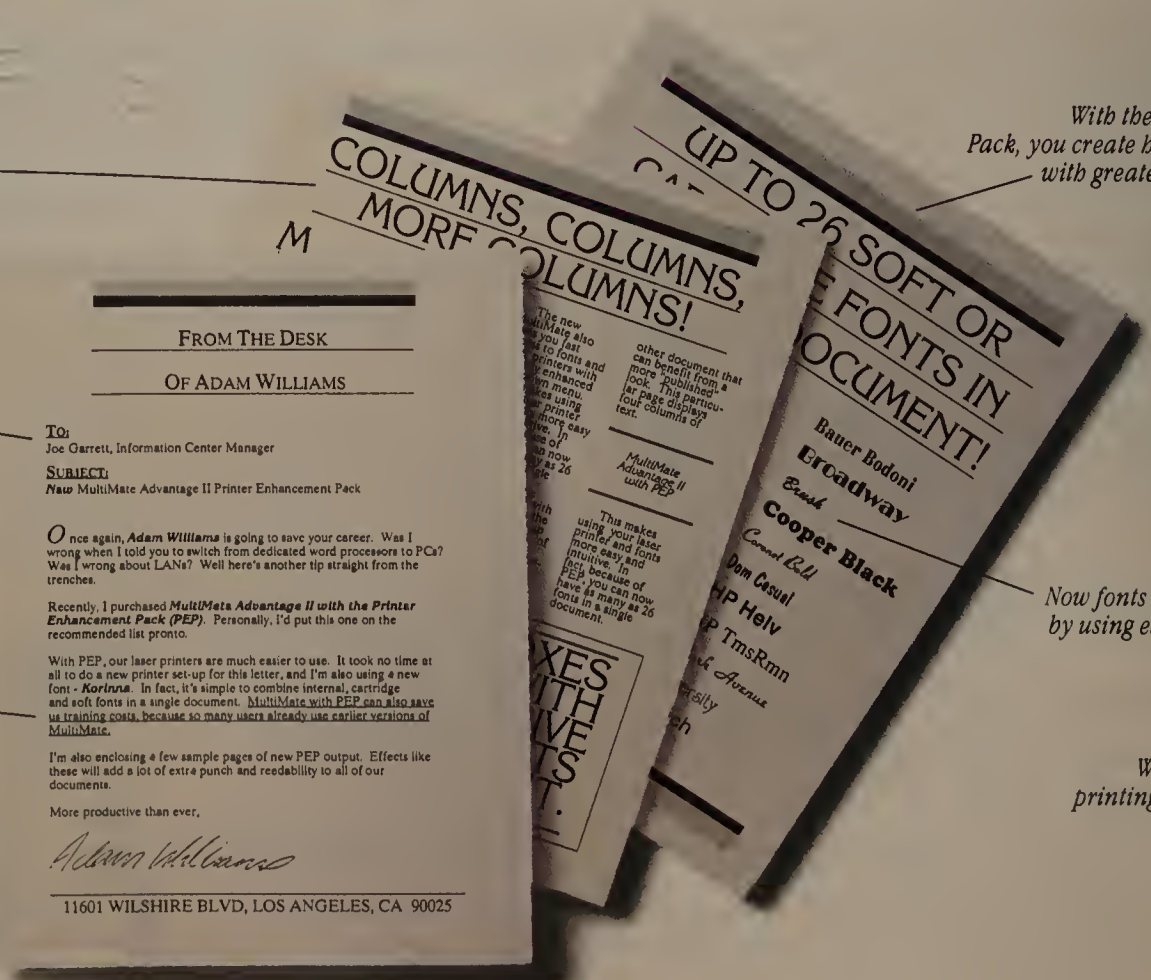

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Circle 185 on reader service card

IBM Shows 486

Targets Compaq 386 Market With a 486 Upgrade That Won't Arrive for Months

Running three-page *Wall Street Journal* ads to herald a 486 board upgrade for its 386-based PS/2, IBM reminded readers of its two-year-old promise to leapfrog the competition with PS/2 technology. The June ad finished by affirming that "the frog has landed." But IBM's PS/2 486/25 Power Platform (see the preview in this issue) won't arrive before the fourth quarter when Intel finally ships the 486 microprocessor, and industry analysts promptly slammed IBM for once again unveiling a product well in advance of shipment. Some see the move simply as a ploy to boost sales of the Model 70-A21—which has suffered from manufacturing delays and hard disk problems—and to appear to reclaim technology leadership from Compaq Computer. The 486-equipped Model 70 outran Compaq's Deskpro 386/33 in demos. But with only three add-on slots and 120MB worth of hard drive compared to the 386/33's eight slots and 1.3GB of storage, the Model 70 may not be adequately equipped for life in the new fast lane. While Compaq still won't discuss machines before ship date, at least half a dozen vendors are expected to deliver similar products within weeks of IBM. Some already one-upped IBM with their own premature 486 announcements. AST unveiled two 486 boards that promise greater performance by exploiting external cache memory and the more flexible expansion options in AST's high-end 386 line. Priced at $2995 and $3695 for upgrades from 33-MHz and 25-MHz models respectively, the AST offerings undercut the Power Platform's $3995 price tag. Ultimately, say analysts, systems will be built from the ground up to truly exploit the 486's unique capabilities—and those models won't start arriving until next year.

Adobe Challenged

PostScript Developer Faces Heightened Competition—Even From Its Best Customer

Adobe Systems faces unprecedented challenges to its dominance of the page description language (PDL) market, although its PostScript standard, entrenched on half a million printers, seems secure. This year Adobe's highly profitable business has been assailed by a gang of PostScript imitators, including an offering from BIOS king Phoenix Technologies. In July, Apple disclosed plans to sell its 16.4 percent stake in Adobe, now worth about $91 million, which it purchased in 1984 for $2.5 million as part of a joint development agreement. Apple plans to release competing technology—scalable fonts and text-layout services in the Macintosh System 7.0 operating system, and a PostScript alternative for future printers. With 29 other manufacturers selling 50 PostScript devices, Adobe should stay highly profitable through year-end, maintains Marketing Director Pat Marriott. The company earned $14.5 million for the six months ended May 31 on revenue of $53.6 million. But since the Apple LaserWriter accounted for 29 percent of this year's PostScript sales, the breakup will grow painful as Apple's new offerings are released in late 1990. Other printer vendors complain about Adobe's high licensing fees; Hewlett-Packard says they represent the main impediment to making PostScript standard equipment on its popular LaserJet. (HP offers a PostScript add-on for $2795—$100 more than the list price of the LaserJet itself.) Many customers, while deterred by PostScript printers' high cost, won't settle for a clone, explains QMS executive vice president Don Parker: "If it doesn't say 'Adobe,' many customers turn and walk out the door." But like Apple, other major manufacturers plan to challenge Adobe with their own PDLs. IBM and Microsoft are evolving one from OS/2's Presentation Manager.

HP Overhauls Fonts

Drops Prices, Targets Individual Applications

Hewlett-Packard slashed prices on its LaserJet font line this month and repackaged 26 offerings into nine cartridges that more closely reflect user needs by application. The font line was formerly arranged by typeface, explains Product Manager Jane Eandi. Now products include cartridges that address the specific font management features in *WordPerfect* and *Microsoft Word* as well as cartridges aimed at spreadsheets, form creation, barcode usage, presentations, text formulas, and foreign character sets. Each cartridge contains three times the fonts of its predecessor and sells for $195, compared to as much as $330 for prior offerings. HP previously released the ProCollection "supercartridge" (see *Product Outlook, PCW*, July 1989), which includes 65 general office and spreadsheet publishing fonts for $300. The new cartridges fit the LaserJet Series II and IID printers, but not the older LaserJet or LaserJet Plus.

$10,000 Color PostScript

QMS Drives Down the Price of Color PostScript Printing, Pushes Printing Technology for General Office Use

Aiming to bring PostScript color printing into mainstream office use and undercut its main rival, QMS is offering a $9995 version of its ColorScript 100 thermal transfer printer. The Model 10 is less capable than the ColorScript 100 Model 20, introduced in April 1988 and used mostly by graphic artists for prepress proofing. But the Model 10 is also $15,000 cheaper. About half the size of its predecessor, it comes with only 4MB of memory (but is upgradable) and offers letter-size printing with a legal-size option (compared to the Model 20's 11-by-17-inch output). QMS executive vice president Don Parker predicts that this price/feature combination will prompt departmental work groups and corporate graphic services to apply PostScript color printing to desktop presentations, business graphics, and desktop publishing applications. He estimates that the Model 10 will sell five to ten times the Model 20's 1000 annual units. The printer also undercuts the ColorScript's principal competitor, Tektronix's $13,000 Color Phaser CP thermal printer, which is equipped with a PostScript clone. QMS cut costs by including less memory and a smaller controller and omitting a hard disk.

Dynabook Debuts

Analysts Underwhelmed, Say Original Concept Still Unrealized

Dynabook Technologies, a San Jose start-up founded by two prominent venture capitalists and ex-Tandon president Dan Wilkie, has taken the wraps off an elegant modular portable bearing the same suggestive name. Built around a 16-MHz 80C286 and scheduled to ship in August, the Dynabook 286 thinks thin. Only 0.3 inch thick, its backlit supertwist LCD is the skinniest on the market. It fits atop a CPU module that is a mere 1.4 inches deep. And a clever docking station provides all required desktop connections. But the 2-to-4-hour lead-acid battery adds 0.4 inch in thickness and 5.4 pounds in weight, so when equipped for travel, the Dynabook hits the scales at 14 pounds—three times the weight of the NEC UltraLite. In size and price, the Dynabook 286 is more akin to Compaq's SLT/286; with 20MB and 40MB hard drives, Dynabook models sell for $5195 and $5795, respectively. While analysts applaud the Dynabook 286's well-considered features, they find it a far cry from the handy little do-all device originally dreamed up by computer scientist Alan Kay. "They should be shot for using the name," grouses InfoCorp analyst David Carnevale, who sees the UltraLite as a better role model. "In the next few months we'll see some real Dynabooks."

FoxPro Is Coming

Data Base Manager Sports New Interface

Fox Software will ship the third iteration of its popular relational data base manager by the end of September for an as-yet-undetermined price. *FoxPro* features a new character-based windowed interface consistent with that of *Foxbase+ Mac.* It also is several times faster than Ashton-Tate's *dBASE IV,* with which it is completely command and file compatible, claims Fox marketing director Richard Ney. "We are trying to break away from that clone image," Ney says. And the quicker the better: Last November, an early preview of *FoxPro* prompted Ashton-Tate president Ed Esber to file a look-and-feel lawsuit before Fox could change the interface, Ney claims.

CompuServe Buys The Source

Telecomputing Pioneers Merge

Another chapter in the saga of personal computing closed in August as CompuServe bought fellow online information service provider The Source. Both began linking early personal computer users over telephone lines in 1979, providing bulletin board and SIG opportunities as well as special data base offerings. However, while CompuServe thrived, The Source subscription list dwindled to 53,000. Source subscribers will be offered a $20 usage credit should they opt to join the 500,000 CompuServe users. A customized menu will acquaint Source members with CompuServe navigational commands. An electronic information service provider since 1969, the Columbus, Ohio–based CompuServe was more diversified than The Source and better-positioned to take advantage of a range of PC opportunities, explains CompuServe spokesperson Rich Baker. ●

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PowerMate 286 Plus

Either machine lets you breeze through word processing, spreadsheets and data manipulation while hardly taking up any room on your desk (thanks to their new streamlined cabinets).

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GPG 9.1

Richard Landry

FRED STIMSON

Why You'll Want a 486

Intel says it's an evolutionary step forward, but we think it's a revolutionary leap ahead.

That's why we predict the 486 will be everyone's favorite computer chip in the 1990s.

Earlier this year when Intel announced the 486 chip, I pulled out a bunch of old press clippings from Compaq's Deskpro 386 debut in late 1986. Three years ago almost nobody anticipated the raging success 386-based PCs would enjoy—least of all IBM, which launched its PS/2 strategy the following spring with systems based on the 286 chip and a 286 operating system, OS/2. Everyone assumed that 386 systems would find limited use only as CAD workstations, LAN servers, and toys for the power hungry—not as the emerging office standard they've become.

Well, history's about to repeat itself—with a twist—if IBM has anything to say about it. Determined to keep Compaq from stealing the thunder again, Big Blue made a point recently of being the first major PC manufacturer to announce a 486 system. And IBM doesn't see it merely as a LAN server or a CAD workstation, either. Instead, it's an upgrade to Big Blue's most popular 386 PC, the desktop 25-MHz PS/2 Model 70-A21 (see the 486 preview in this issue).

Beyond sheer power lust, why would anyone want a 486 desktop PC? IBM is betting that users will be as excited about 486 systems as they were over the first 386 PCs. But that's a tall order. PCs based on the 386 captured users' minds and pocketbooks because they made revolutionary advances over mainstream, business-class ATs. They were twice as powerful, delivered new capabilities unknown to the 286, and promised to run both existing software and software not yet invented. There aren't too many times in life when you can play it safe by buying the most exciting product around. But here was one such occasion.

Intel has been pitching the 486 as a smooth extension to the 386 processor line, and that's true. Just like 386 PCs, 486 systems will run old DOS software as well as software created for the 286 or 386. But 486 PCs also have a revolutionary side that can't be ignored. In *PC World*'s preliminary testing, IBM's Model 70 upgrade ran DOS business applications about twice as fast as the original 386 configuration. And that represents more of a floor than a ceiling for 486 performance. You can expect that a system equipped with high-performance intelligent peripherals will do much better. In fact, as Compaq has been suggesting all along, the 486 may provide the first solid rationale for dumping the AT standard in favor of a high-speed PC bus like the Micro Channel or EISA.

The 486 is revolutionary in other, less obvious ways, too. Many developers seem intrigued that the 486 will make math coprocessors standard equipment in a whole new generation of PCs. Most math coprocessors today are used to put some muscle into spreadsheet or CAD operations. But a math coprocessor could just as easily speed up a graphical environment like *Windows* or Presentation Manager and give it some extra touches, like scalable fonts.

Finally, the 486 is likely to foster a revolution in PC pricing that will put 386 systems within reach of almost every business user. Just as 386 PCs sent the cost of 286 technology into a nosedive, 486 systems are destined to drive 386 prices sharply down. Within a year, you can expect that 20-MHz 386s will be standard isue in most companies.

(continues)

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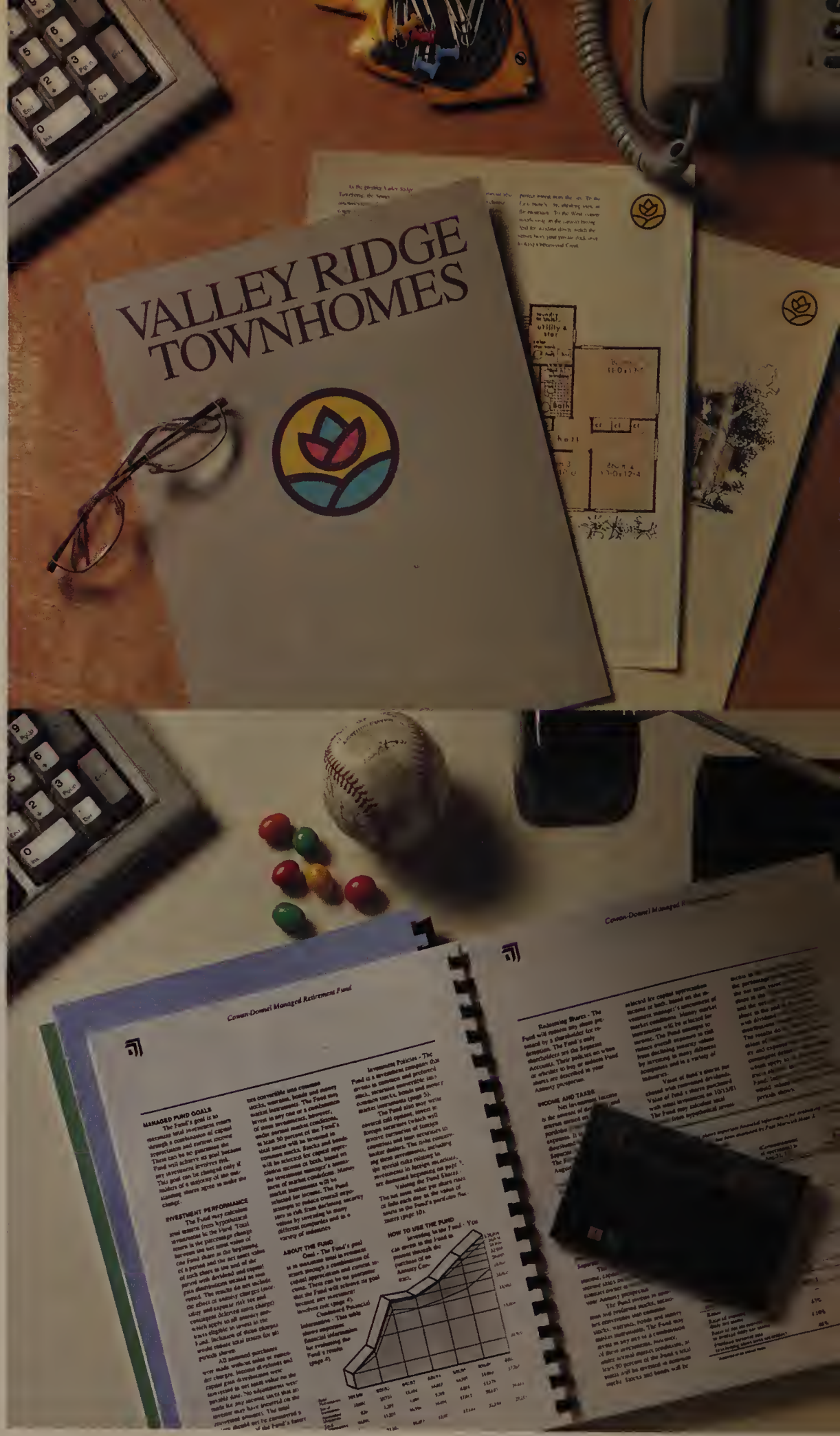

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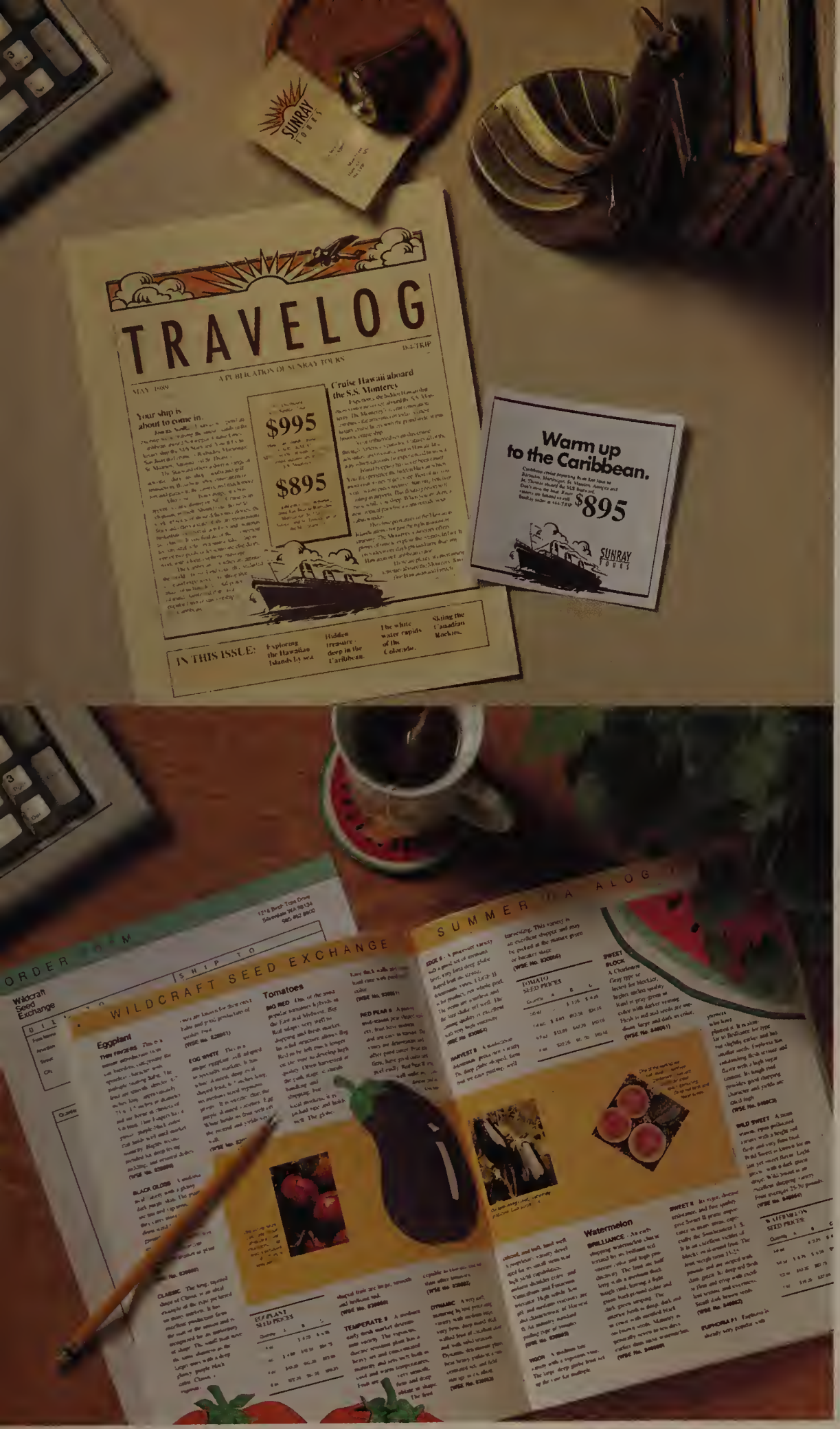

PageMaker works well in your existing business environment, too. It does a beautiful job of integrating with your favorite word-processing and spreadsheet programs. Its files even transfer directly between Macintosh and PC versions. Plus, it works with more business software and printers than any other desktop publishing product available today.

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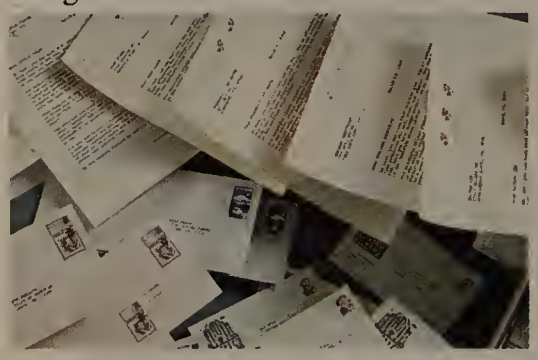

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RICHARD LANDRY

You might think it disingenuous of IBM to push 486 hardware technology when its 286 operating system hasn't yet left the ground. Still, we can thank Big Blue for cutting through the usual hype to see the 486 for what it is: a great PC platform that will last many years into the future. If you want a high-performance system that's also a safe investment, then you'll want a 486 PC.

As always, I'm interested in your opinions on this or any other subject. Write to me at *PC World*, 501 Second St., San Francisco, CA 94107; fax 415/442-1891; MCI Mail Richard Landry/301-3685. ●

POWER TIP NO. 64

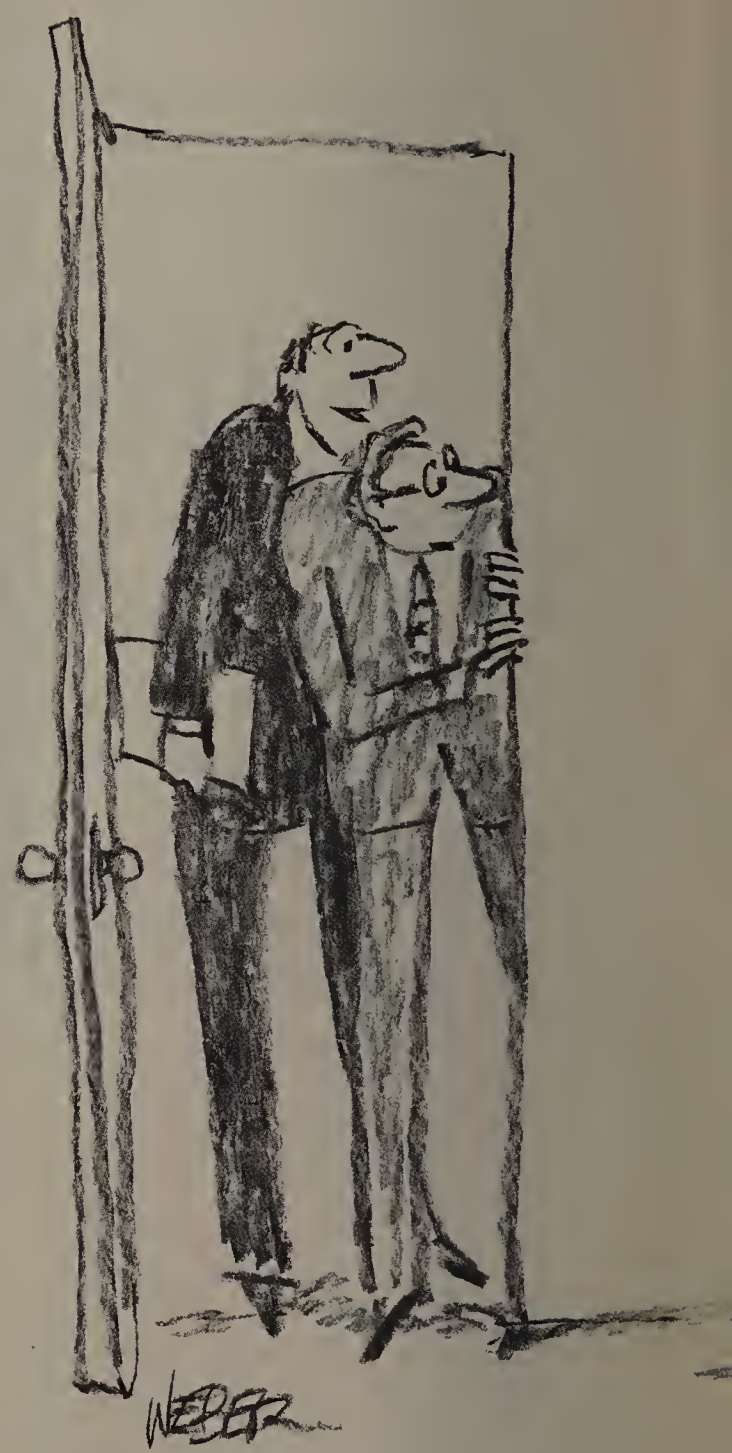
Seize the Time With 1-2-3

If it's important to know when you entered an invoice or created a report with 1-2-3, the @NOW function provides a convenient date and time stamp for worksheet entries. However, 1-2-3 updates @NOW information every time you recalculate a worksheet. To freeze the current value of an @NOW function, position the pointer on the @NOW cell, select Range Value, and then press <Enter> twice. 1-2-3 replaces @NOW with the current value of the function. Since the entry is no longer a function, it won't change when you recalculate the worksheet.

Randy Shigio
San Francisco, California

IBM PRESENTS
THE SOLUTION TO THAT
AGE-OLD BUSINESS
QUESTION.

"When Fosberry said a PS/2 with Micro Channel would let him juggle ten things at once and still have time to break for lunch, he meant it."



How're you going to do it?

These days, no matter what size your company, you've got to be able to keep a lot of balls in the air to stay competitive.

The Genius Of Micro Channel. Which is why IBM developed the Personal System/2® with Micro Channel.™ Micro Channel can support multiple operating microprocessors. So you can, for example, separately manage peripherals, while freeing up the main processor to crunch numbers. A bus master can even be sending a fax while another manages traffic on a network, all with greater reliability.

Naturally, every PS/2® with Micro Channel runs DOS and OS/2.™ So with OS/2 Presentation Manager,™ you can do multiple tasks concur-

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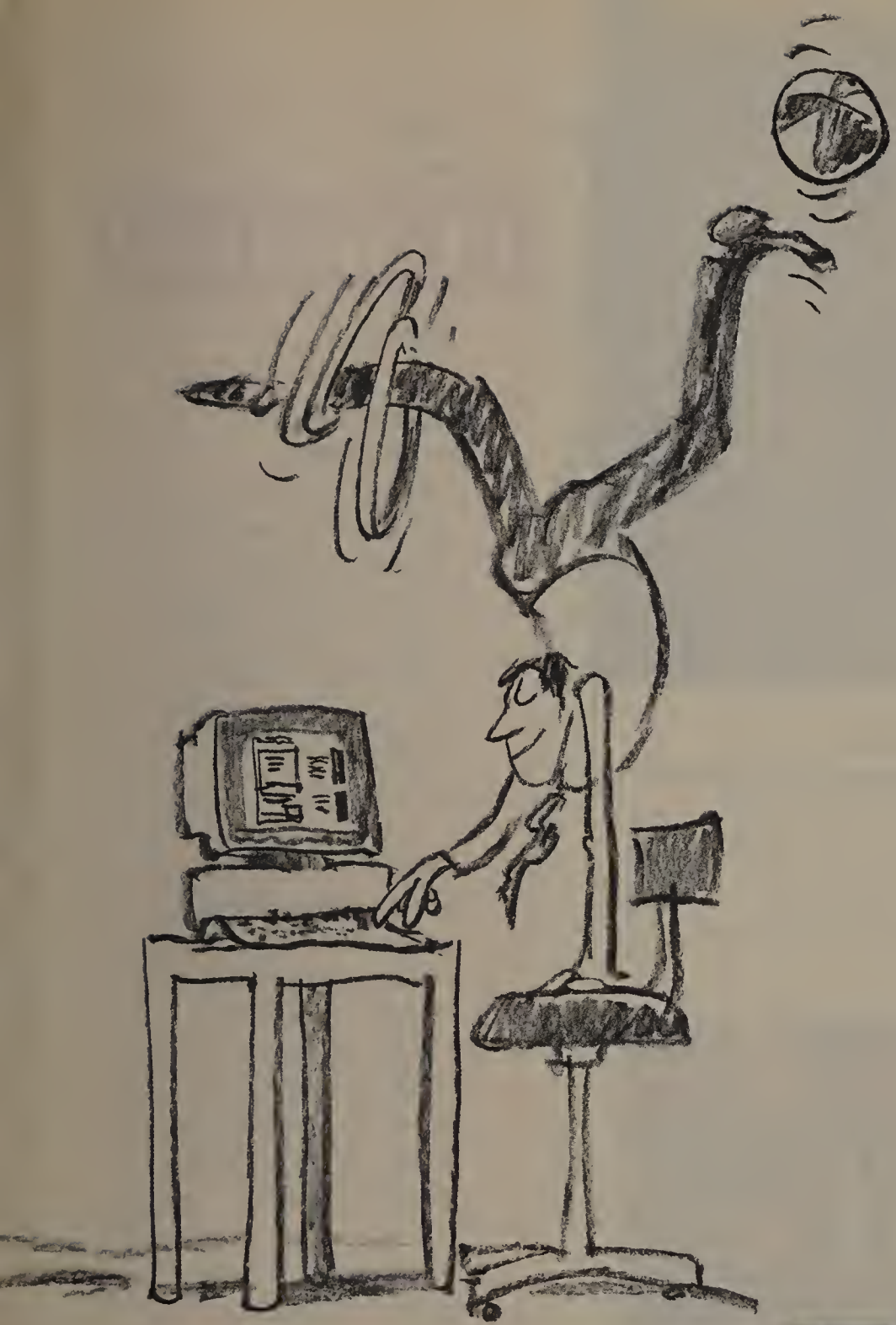

PS/2 it!

rently, all with an easy-to-use graphical interface. What's more, with Micro Channel, there are no DIP switches to set, for simpler, more reliable installation. You can find and reset cards anywhere in the network—right from your desk!

The Solution Is IBM. So, to manage lots of information, jobs, hardware and software, invest in the PS/2 with Micro Channel. Contact your IBM Authorized Dealer or IBM marketing representative. For a dealer near you, call 1 800 IBM-2468, ext. 142. You'll learn there's almost nothing you can't do if you PS/2 it!

IBM®

PC World reported, "The Good News - Affordable point-of-sale (POS) systems are revolutionizing Main Street America. Retailers are tracking their inventory as they ring up sales, and the dramatically improved flow of information has helped businesses multiply in size."

"Balboa Office Supply in San Diego, with a 32,000 item inventory, was looking for a POS system that was as fast and easy to use as possible. Chuck Atkinson Programs delivered."

"Chuck's POS automatically captures and records transactions as they happen. Once this information is stored, you can pull reports that let you manage as deftly as the huge chain stores. You gain better control and get information never before available."

The result is quicker growth, increased profits, fewer hassles, and a competitive edge.

You can have up to 31 stations on DOS computers. Money-back guarantee, since 1978. English & Spanish versions available thru qualified dealers world-wide.

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3737 Ramona Fort Worth, Texas 76116-7007

Circle 27 on reader service card

Next in

PC WORLD

October

Spotlight on Spreadsheets

Release 3 is here—at last! Does the new *1-2-3* have what it takes to keep spreadsheet users loyal to Lotus? Don't decide until you've read our comparison of the latest versions of *1-2-3*, *Excel*, and *SuperCalc5*.

Then, after you've settled on a spreadsheet standard, focus on productivity. We've sorted through hundreds of books, videotapes, and software tutorials—you'll find the best in our Buyers' Guide to spreadsheet training tools.

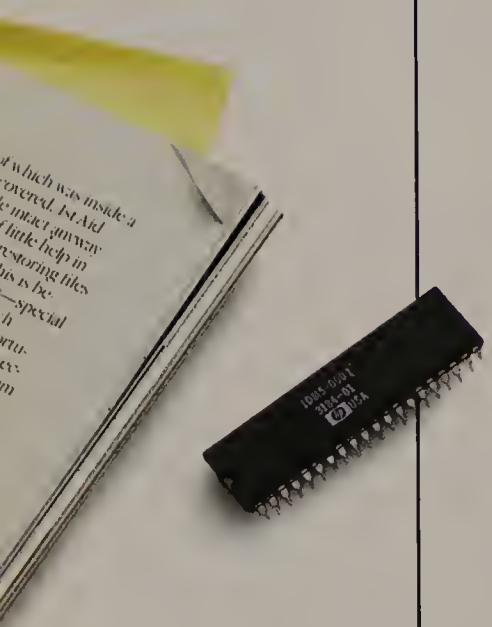
Finally, if your business works in three dimensions, you'll appreciate some expert tips on how to consolidate worksheets for maximum impact.

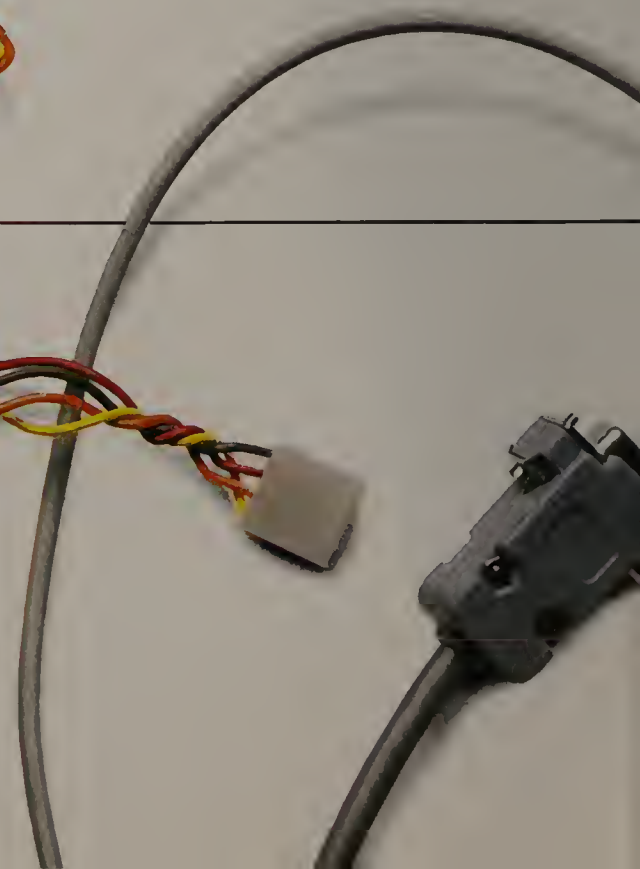
1989 World Class Awards

The ballots are counted, and *PC World* readers have spoken. Our Seventh Annual World Class Awards single out the old masters and the most promising newcomers in hardware and software.

You've spent
the best years
of your life
searching for it.

You've analyzed, s
experimented, in
pondered, probed
discovered the o





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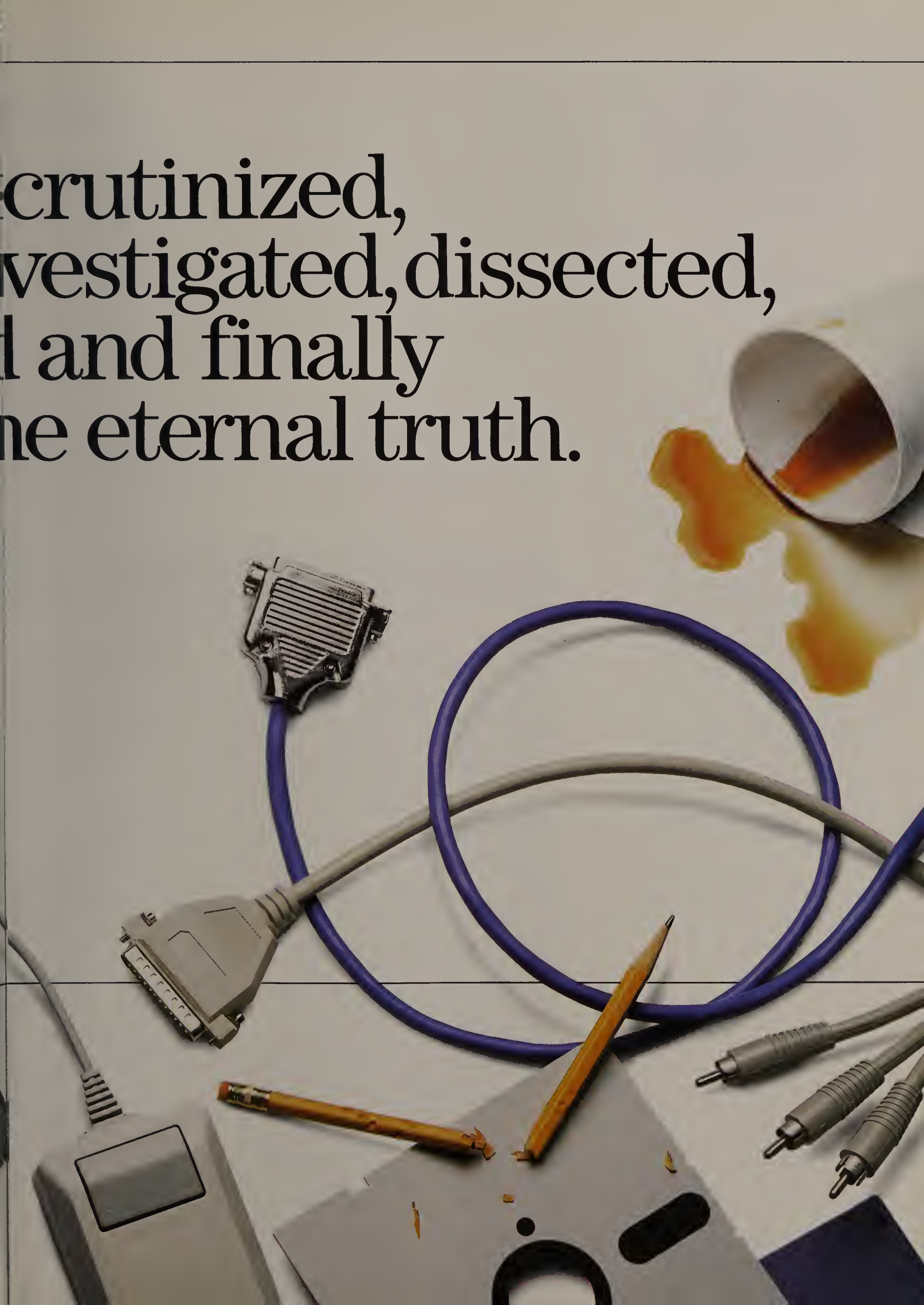
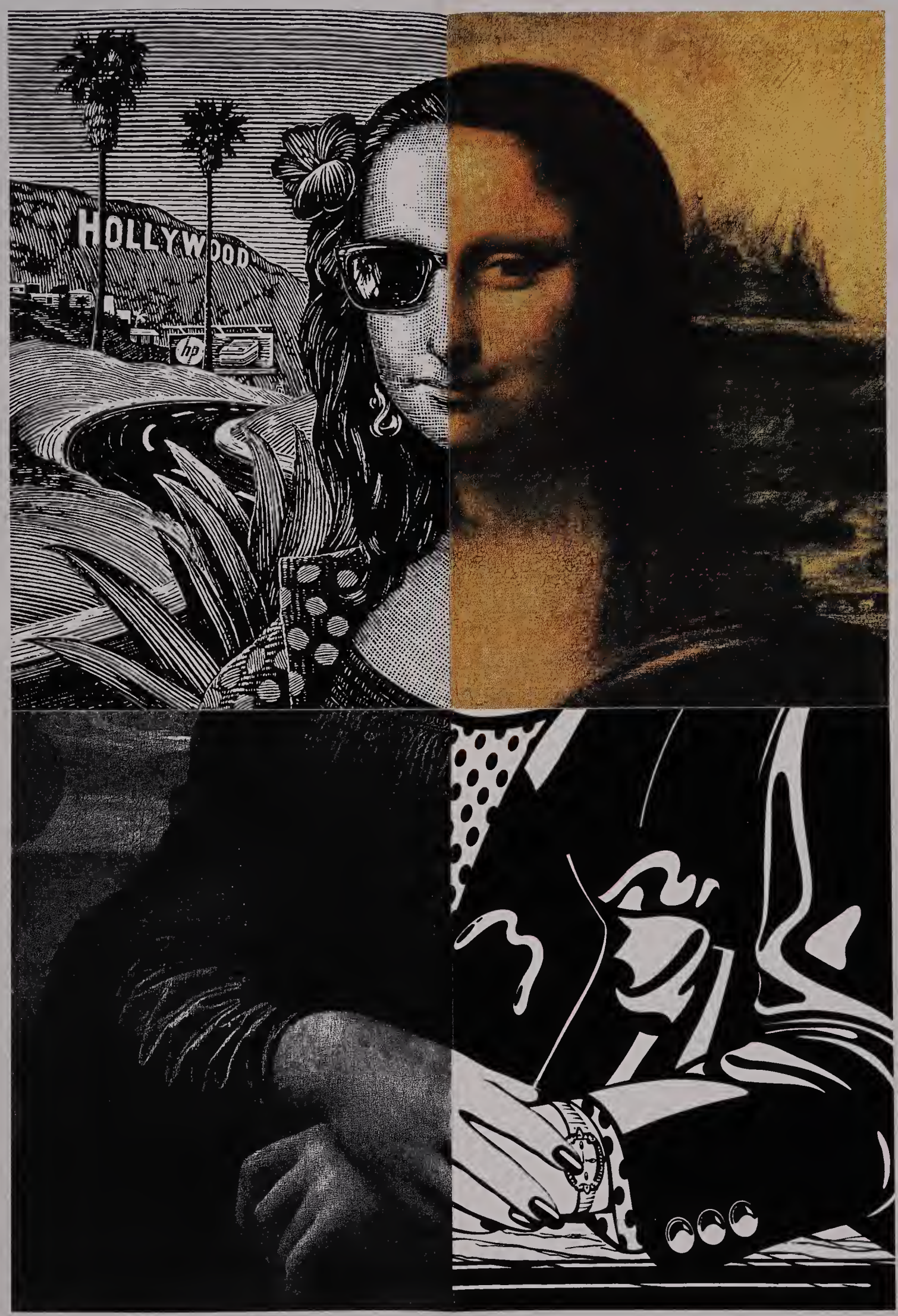


You already know about the HP LaserJet printer's razor-sharp text, saturated black tones and large selection of scalable typefaces. They've made LaserJet the most popular laser printer in history.

But we felt our equally fine graphics capability went unappreciated. So we commissioned this portrait of an old friend who moved to L.A. Notice her smooth curves, subtle gray shades and highly defined features.

There's a LaserJet to meet everyone's needs. Whether you need larger paper volume, duplexing or envelope feeding. So when it really counts, better do it on a LaserJet. The original, and still the best.

L A S E R J E T



Looks are everything.

S C A N J E T

Pretty pictures, aren't they? Actually, the black and white images, right down to the brush strokes on Mona Lisa's hands, come unretouched from the HP ScanJet Plus scanner. It's the first affordable 8-bit scanner to bring photographic quality to your desktop.

At only $2190,* ScanJet Plus provides the top image processing in its class. With 256 gray shades. Over 100 contrast settings. Even the widest range of scaling, from 4 to 200% in 1% increments.

And ScanJet Plus reads both bound and loose-leaf documents as well as it scans images. Just plug it into your IBM AT-compatible, PS/2 or Macintosh computer and experience the finest desktop reproduction available. A woman like Lisa deserves no less.

Poor Leonardo. He didn't anticipate the HP PaintJet color printer with its thousands of brilliant colors. Now anyone with $1395* (add $125 for a Macintosh interface) can produce a masterpiece of fine art.

Or a masterpiece of business. Because the PaintJet works with nearly all of your favorite text and graphics software packages. On both IBM-compatible and Macintosh computers.

So whether you're making a presentation or sharing your vision with the world, you can't beat the PaintJet. It's what artists are starving for.

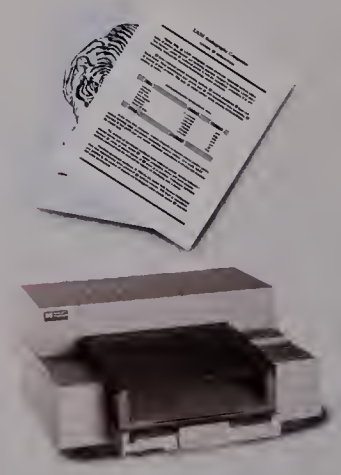
P A I N T J E T

D E S K J E T

Why settle for dot matrix when you can have laser quality? The HP DeskJet PLUS printer prints at 300 DPI, thanks to its advanced inkjet technology.

Think of it, laser-quality text and graphics for only $995.* Apple users can get the same high quality on their desktops with the HP DeskWriter printer designed specifically for the Macintosh; it's only $1195.* No more bulky dot matrix. No more jackhammer noise. No more of that connect-the-dots look that keeps your reports from being taken as seriously as they should be.

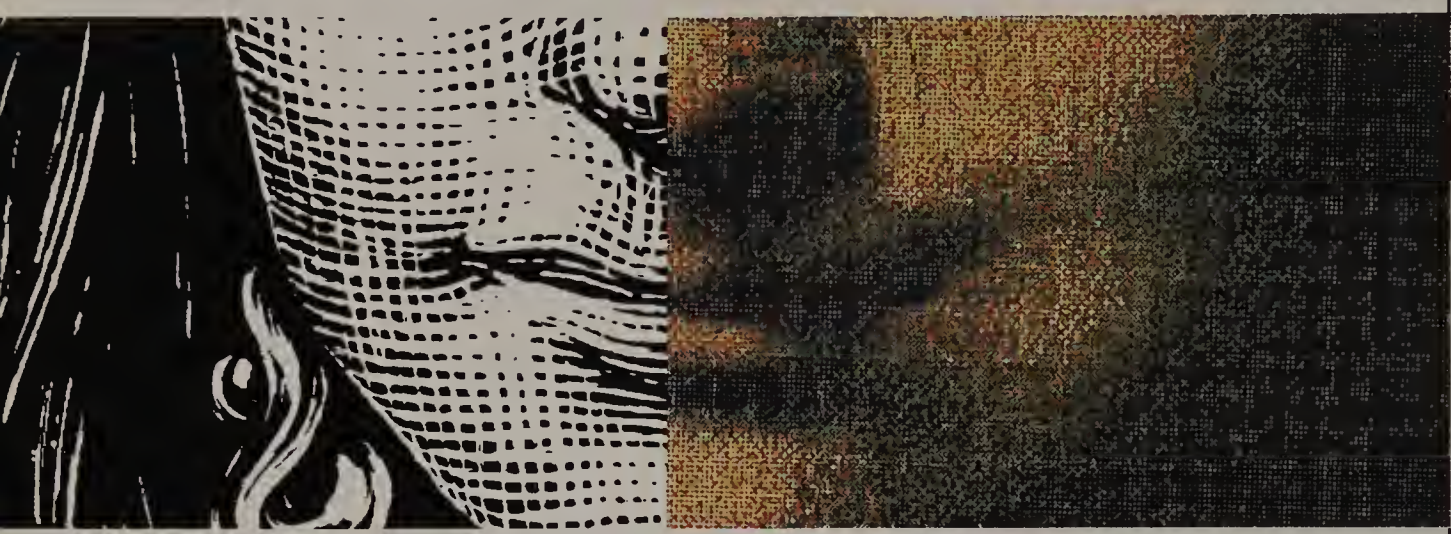
DeskJet PLUS works with the most popular software and with any IBM-compatible PC. So take a look at DeskJet PLUS. It may not be a laser printer but you don't have to tell.



HEWLETT PACKARD

*Suggested U.S. list price.

Send us your most creative output*



and you could win something to smile about.

Announcing Hewlett-Packard's "Looks Are Everything Sweepstakes."

Here's a challenge that can really put a smile on your face. Send us an original printed sample (no mechanical reproductions, please) of your most creative computer output—business graphics, design work, whatever—and you could win a complete Hewlett-Packard system or other valuable Hewlett-Packard prizes.**

Show us your genius. We know you've got a computer-generated masterpiece—something you created for your boss, your own company, or even just for the fun of it. Send it to us, along with the attached entry form, and we'll automatically enter you in a random drawing.

See official rules on back of entry card for complete details.

To receive another insert and official entry form, product literature or the name of your nearest authorized Hewlett-Packard dealer, call: **1-800-752-0900, Ext. 712H.** One entry form per request. While supplies last. Entry form request must be made no later than September 30, 1989.

There is a better way.

HEWLETT PACKARD

*In lieu of sending computer output, you may send completed sweepstakes entry form only (name, address, and phone # required).

First Prize: One Hewlett-Packard system, which will include one of each of the following: Vectra QS/20 PC, LaserJet Series II printer, PaintJet color printer, DeskJet PLUS printer, ScanJet Plus scanner and Graphics Gallery Collection software package (includes Drawing Gallery and Charting Gallery). **8 Second Prizes: One per winner from among eight randomly selected Hewlett-Packard peripheral products: two LaserJet Series II printers, two ScanJet Plus scanners, two PaintJet color printers, two DeskJet PLUS printers. **50 Third Prizes:** One Hewlett-Packard Graphics Gallery Collection software package (includes Drawing Gallery and Charting Gallery) per winner. **200 Fourth Prizes:** One Hewlett-Packard ProCollection Font Cartridge (includes 65 different fonts) per winner.

©Hewlett-Packard Company PE12917

Enter me in the "Looks are Everything" Sweepstakes

Send us your most creative computer output,* along with this entry form. Soon, you could be sporting a mysterious smile of your own.

Please print your name and address on the output printout as well as completing this entry form.

Attached, please find my entry in Hewlett-Packard's "Looks are Everything" Sweepstakes.

Please answer the following questions:

1. Is working with PCs fun for you, almost a hobby?
Yes ☐ No ☐

2. Do you spend time helping co-workers solve computer-related problems?
Yes ☐ No ☐

3. Do people within and outside your company ask your opinion about what types of PC hardware/software to buy?
Yes ☐ No ☐

4. Do you personally buy equipment for yourself and/or others?
Yes ☐ No ☐

5. Please briefly answer the following questions:

WHAT IS POSTSCRIPT?

WHAT IS OCR?

WHAT IS MICRO CHANNEL?

WHAT IS A BATCH FILE?

WHAT IS EXTENDED MEMORY?

NAME

COMPANY & TITLE

ADDRESS

CITY STATE ZIP DAYTIME PHONE

TO CREATE MY MASTERPIECE, I USED (SOFTWARE; COMPUTER; PERIPHERAL; FONTS)

*In lieu of enclosing computer output, you may send completed sweepstakes entry form only (name, address, and phone # required).

See official rules on back for details.

Hewlett-Packard "Looks are Everything" Sweepstakes

OFFICIAL RULES

1. To Enter. No Purchase Necessary. Complete official entry form, attach it to a printout of your most creative original computer output (business graphic, design work, etc.) —no mechanical reproductions are permitted—and mail to Hewlett-Packard "Looks are Everything" Sweepstakes, 3554 E. Enterprise Drive, Anaheim, CA 92807. Entrant's name and address must be included on the output. In lieu of enclosing a computer output, you may enclose a sweepstakes entry form only (name, address and phone # required). All entries must be received no later than 10/31/89. Only one entry per envelope. All requests for entry forms via 800 telephone number must be made no later than 9/30/89. Not responsible for late, lost or misdirected entries. All entries become property of Hewlett-Packard and will not be returned.

2. Eligibility. Sweepstakes open to U.S. residents except employees and their immediate families of Hewlett-Packard, and advertising and promotional agencies. Sweepstakes void where prohibited.

3. Prizes. First Prize: One Hewlett-Packard system, which will include one of each of the following: Vectra QS/20 PC, LaserJet Series II printer, PaintJet color printer, DeskJet PLUS printer, ScanJet Plus scanner, Graphics Gallery Collection Software package which includes Drawing Gallery and Charting Gallery (approx. total retail value $14,364).

8 Second Prizes: One of the following Hewlett-Packard peripheral products per winner as determined by chance: (2) LaserJet Series II printers (approx. retail value per item $2,695), (2) ScanJet Plus scanners (approx. retail value per item $2,190), (2) PaintJet color printers (approx. retail value per item $1,395), (2) DeskJet PLUS printers (approx. retail value per item $995).

50 Third Prizes: One Hewlett-Packard Graphics Gallery Collection software package which includes Drawing Gallery and Charting Gallery (approx. retail value per item $499) per winner.

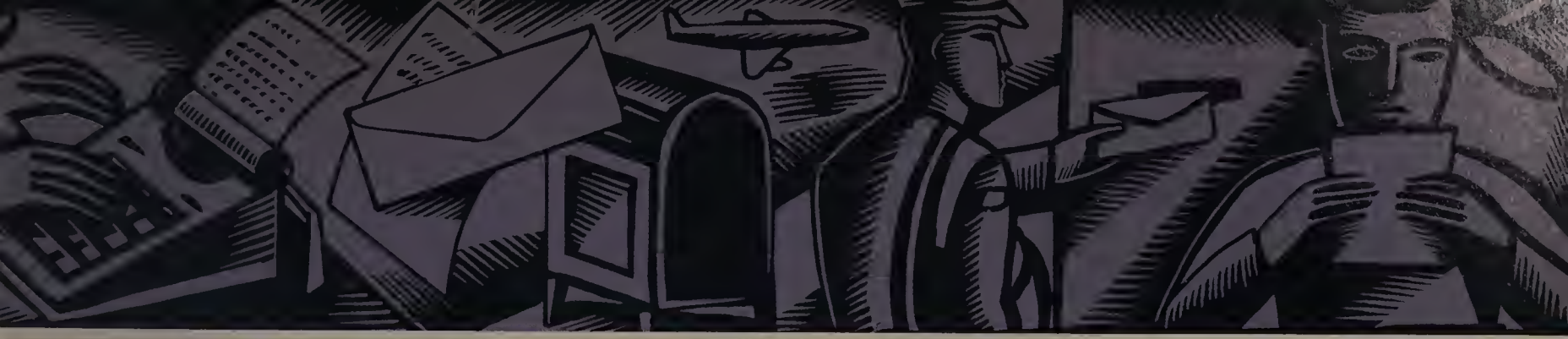
200 Fourth Prizes: One Hewlett-Packard ProCollection Font Cartridge (approx. retail value per item $300) per winner.

4. Drawing. Winners will be selected from among all entries in a random drawing to be conducted on or about December 1, 1989 by the Howard Marlboro Group, an independent agency. Winners will be notified by mail 6-8 weeks after drawing. Odds of winning will depend upon the number of entries received. All decisions will be final.

5. General. All taxes on prizes are responsibility of winners. Prizes won by minors will be awarded in the name of parent or legal guardian. Affidavits of eligibility and publicity/liability releases will be required of major prize winners; and failure to return them within time specified will cause prize award to be void. No prize transfers. No prize substitutions except by sponsor due to prize unavailability. Only one winner per family or household. By participating, entrants agree a) to these rules and decisions of the indepedent agency which shall be final in all respects; b) to the use of their names, addresses, entries—including any attachments—in advertising and promotional materials for Hewlett-Packard products. If prize is returned undeliverable, it will be awarded to an alternate winner. All local, state and federal laws apply.

6. Winners List. For names of prize winners, send a self-addressed stamped envelope after 1989 to: Hewlett-Packard Sweepstakes Winners, P.O. Box 8015-345, Redondo Beach, CA 90277.

HEWLETT PACKARD



LETTERS

Reactions and responses from the PC World community

...Those Who Help Themselves

Richard Landry's May column ["Software That Supports Itself," *PCW*] makes a case for developers of new software to shoulder "the training and support burden that its growing complexity has created." Unless users take an interest in learning the capabilities of their software, no software can satisfy their needs.

A product can further business objectives only if someone adapts it to specific, individual needs. By their very nature, broadly marketed software products can only provide the tools to solve problems. I don't see their broad capabilities as a weakness, I see them as a strength that allows me to tailor their capabilities to my needs.

David G. Martin
Boston, Massachusetts

Graphic Journal Entry

Congratulations on Stewart Alsop's *Windows Journal*. My organization made the transition from character-based applications to the *Windows* environment over the course of the last year. *Windows* applications are here now. I have counted over 200, plus a host of useful tools and utilities. Let's hope your insights spur others to follow and keep *Windows* developers on their toes.

David C. Howell
PED Manufacturing
Oregon City, Oregon

Dangerous Recovery

After reading "How to Recover from Hard Disk Disaster" [*Tips and Techniques*, *PCW*, May 1989], I feel compelled to point out that one of the suggested methods could cause a great deal of additional grief. Users should be warned that DOS's RECOVER is a *dangerous* utility. Most recovery utilities won't touch your disk if it seems OK. RECOVER, on the other hand, can take a perfectly good disk and turn it into chaos. You should type a file name after entering RECOVER and use the command to recover only one file.

Gale R. Horst
Systems Software Engineer
Zenith Data Systems
St. Joseph, Michigan

BASIC Benchmark Brouhaha

Thank you for choosing *QuickBASIC 4.5* as a Best Buy [Languages Special Report, *PCW*, April 1989]. However, the conclusion about *QuickBASIC*'s performance should not have been based on a single benchmark. There is insufficient data to support the claim that *Turbo Basic* is faster in general. If NSTL used thorough published benchmark suites—we have found ones with 35 to 48 benchmarks covering areas like graphics, math, file I/O, looping, and sorting—they would find that *QuickBASIC 4.5* beats *Turbo Basic 1.1* in 65 to 74 percent of cases.

Ray Kanemori
BASIC Product Manager
Microsoft
Redmond, Washington

NSTL replies: PC World *and NSTL are committed to application-based performance testing. The best way to test a compiler is to write a real application with it, but the most popular BASIC compilers don't use identical syntax. They support common source code only at the level of BASICA—a small fraction of the compiler's total features. Our benchmarks use this common subset so that we can run the same code on all products. We believe the test we ran fairly characterizes the real-world performance of these products.*

Key to Success

In your review of LAN operating systems ["Seven Top LANs: A Hard Look at Ease of Use," *PCW*, June 1989], Robert Laur-

(continues)

iston complains about Banyan's server key. Besides providing copy protection, the key identifies the server to other servers in a multiserver network. The key also contains information about installed options. Unlike with PC-based keys for programs like *AutoCAD*, only the server has to have the key. User PCs are unaffected.

Banyan Vines is a big step up over IBM's *PC Network*. Our portion of the company's network uses four servers to connect about 140 users over four plant sites. Since users are logged in to the network rather than a server, visitors from other parts of the company have access to all their usual services by just logging in.

William Newkirk
Network Administrator
Collins Commercial Avionics Engineering
Melbourne, Florida

Here's the PC Voice Mail system that can increase your productivity by over 9 weeks.

The average business person ***wastes*** 5 to 7* hours each week on the telephone. That's over 9 weeks a year of wasted time and profits. That's why you need Watson.

What Is Watson?
It's the $199 hardware and software system that turns your PC and telephone into an intelligent communications system that outperforms voice messaging systems costing thousands of dollars more.

Why Watson?
Because Watson invented the category of PC voice mail. Because *PC Magazine* selected Watson Version 1 as "Editor's Choice for Product of the Year in 1984." Because Watson Version 6.23 is a Hayes compatible modem (1200 or 2400 BPS) that runs completely in the background without interfering with other computing functions. Because Watson comes with a 60-day free support program. Because Watson has over 30,000 satisfied users. *And because over 45% of our sales come from user referrals!*

All This For Just $199.
With basic Watson you'll get a single or multiple user system that answers the phone; forwards messages to *any* phone, even pagers; provides private and public voice mailboxes; gives you a personal calendar and programmable alarms plus a dictation system with full featured voice editing. You'll get auto dialing, remote access operation and message retrieval. Plus a sortable phone book based on a Rolodex™ file card structure in which you can enter free form notes and do key word searches. And it's all yours for just $199.

Watson—Voice Information System (VIS)™ Option.
An English-like command language that allows you to customize voice messages, control message sequences with touch tones for both inbound and outbound response applications.

Hear All About It.
To decide which Watson is right for you, *call our Demo Hotline. You'll hear an actual demonstration* and discover all the ways Watson can work for you.

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1-800-6-WATSON, EXT. 241. In MA 1-508-651-2186 EXT. 241. Or to order Watson directly, call 1-800-533-6120 EXT. 241 (in MA 1-508-655-6066 EXT. 241).
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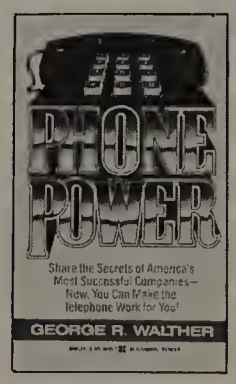

*George Walther, *Phone Power* (New York: Berkley Books, 1986).

Call on the power of **Watson**®
from **Natural MicroSystems** NMS
8 Erie Drive, Natick, MA 01760-1313

Circle 63 on reader service card

IV What It's Worth

While the review "Five Against IV" [*PCW*, May 1989] is otherwise fair, I was disturbed by one comment: Alan Schwartz states that converting *dBase III Plus* applications to *dBMAN 5.1* requires "line-by-line recoding." I know there are a few incompatibilities, but the conversion does not require line-by-line recoding. The entire *SBT Accounting Software Library*, with over 10MB of source files, needs less than five syntax changes from *dBMAN 5.1*. That is an insignificant conversion effort.

dBMAN 5.1 has more than 130 enhancements over *dBASE III Plus*, incorporated from the suggestions of heavy-duty ex-*dBASE* developers. Was the point of the article to identify the Best Buy in data base managers or the one most compatible with *dBASE III?*

Charlie Tseng
VersaSoft
San Jose, California

My primary points of reference in the review were performance, extended features, value, and dBASE *compatibility. While strict compatibility is of minimal importance to a developer considering a new product, it is crucial to the typical user/manager looking to juice up the departmental data-churner.*

(continues)

IT EATS IBM'S LUNCH... AND SERVES DELL FOR DINNER!

Introducing Wells American's CompuStar II. It's one *hungry* machine. Feed it the toughest applications you can dish out and it's ready for "seconds" before IBM, Dell and all the others even get started.

IT FEEDS ON THE COMPETITION.

CompuStar II's enormous appetite for devouring the competition comes from its unique, modular design. Interchangeable, plug-in CPU "modules" are available in 80286, 80386SX and 80386 configurations. The modules are remarkably inexpensive — as little as $750 for a '286 module, and incredibly powerful.* The 33MHz '386 module achieves a stunning MIPS rating! Best of all, for up to one full year after purchase, you can trade in the module you originally select toward the purchase of any of the other more powerful modules.

IT DEVOURS OTHER COMPACTS.

Unlike other small footprint micros, CompuStar II won't put your computer expansion needs on a diet. Each system features an amazing *six* bus slots — four of them available in a fully configured VGA system. That's 25% more than IBM or Dell gives you. Better yet, you can have up to 11 slots with CompuStar II's exclusive bus expansion chassis. No other compact system available offers this much room for growth. And no other comparably sized system can accommodate that growth better than CompuStar II.

BUS EXPANSION CHASSIS

Its whopping 200 watt power supply gives you more than *twice* as much reserve power as IBM or Dell.

And CompuStar II has more room for disk/tape drives — *four* compartments in all; three accessible from the front panel. IBM and Dell give you just three compartments and only two are accessible from the front. CompuStar II also accommodates $5\frac{1}{4}$" *and* $3\frac{1}{2}$" disk drives. IBM and Dell restrict you to $3\frac{1}{2}$" drives only.

IT'S ALSO WELL-MANNERED.

Worried about quality and reliability? Don't! Wells American has been making PCs longer than IBM *or* Dell! Each CompuStar II is money back guaranteed for 31 days, factory warranted for a full year and can be field serviced from hundreds of locations worldwide.

When you think about it, buying an IBM or Dell system instead of our new CompuStar II is sort of like eating hamburger when you could have had steak — and paid less for it. CompuStar II. . .from Wells American. It makes "mincemeat" of everything else.

To receive a CompuStar II product information kit, **call 1-803-796-7800.** VAR inquiries also welcome.

Wells American.

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*CompuStar II'S CPU performonce is so incredible you won't believe it! Coll or write for complete benchmark information. Certified FCC Closs A. For business use only.

merican Corporation 1989

Circle 216 on reader service card

In stating that dBMAN *requires line-by-line recoding, I didn't mean to imply that every line needed to be rewritten but that the syntax incompatibilities could not be corrected automatically. —Alan Schwartz*

How Did You Do That?

Since we are shopping for video cards, we read your VGA article ["VGA Boards Raise the Standard," *PCW*, May 1989] with enthusiasm. Unfortunately, discrepancies in the article have created more confusion than clarity. In the text and the table, you state that the Video Seven FastWrite and V-RAM VGA cards lack drivers for 1024 by 768 resolution. On the NSTL chart, you run test results for both cards at that resolution. Please clarify.

John Korcok
Don Mills, Ontario, Canada

At the time the VGA roundup was written, the Video Seven FastWrite VGA did not come with a 1024 by 768 driver for AutoCAD. *However, the Video Seven V-RAM VGA did. After verifying that the drivers were interchangeable, we used the V-RAM VGA's* AutoCAD *driver for the FastWrite* AutoCAD *test.*

Both the FastWrite VGA and the V-RAM VGA now come with 16-color, 1024 by 768 drivers for Windows 2.0, Windows/386, *and* AutoCAD. *You can download these and other new drivers from Video Seven's 24-hour bulletin board (415/656-0503). —Ed.*

Corrections and Clarifications

Data Recovery Service, listed in May's "How to Recover From Hard Disk Disaster," has a new phone number: 415/585-7448.

The correct address for Nor Software, whose *Printer Genius* was included in our May "Buyers' Guide: More Power to Your Printer," is 527 Third Ave., New York, NY 10016; 212/213-9118.

In our May review "VGA Boards Raise the Standard," we published an incorrect phone number for Video Seven. The correct number is 415/656-7800.

Toshiba's 5100 transportable has a lower RAM ceiling than we listed in our May review "Porta-

(continues)

It takes a great performance for a disk to become a legend. Chuck Berry has what it takes. And so does PROCOMM PLUS. It gives you power and ease of use that surpasses communications software costing $250 or more. Yet PROCOMM PLUS costs much, much less. Which simply means when you want communications software that gives you a great performance, you can still *be good* to your wallet.

LEGENDARY DISKS

Ask your software dealer today about PROCOMM PLUS, now available in stand-alone and local area network versions.

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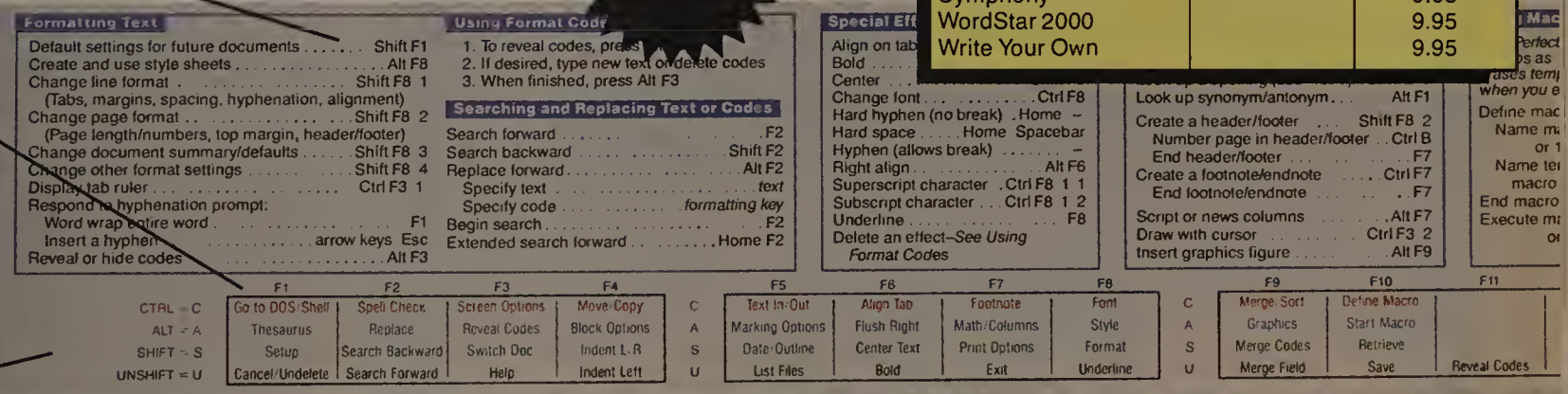

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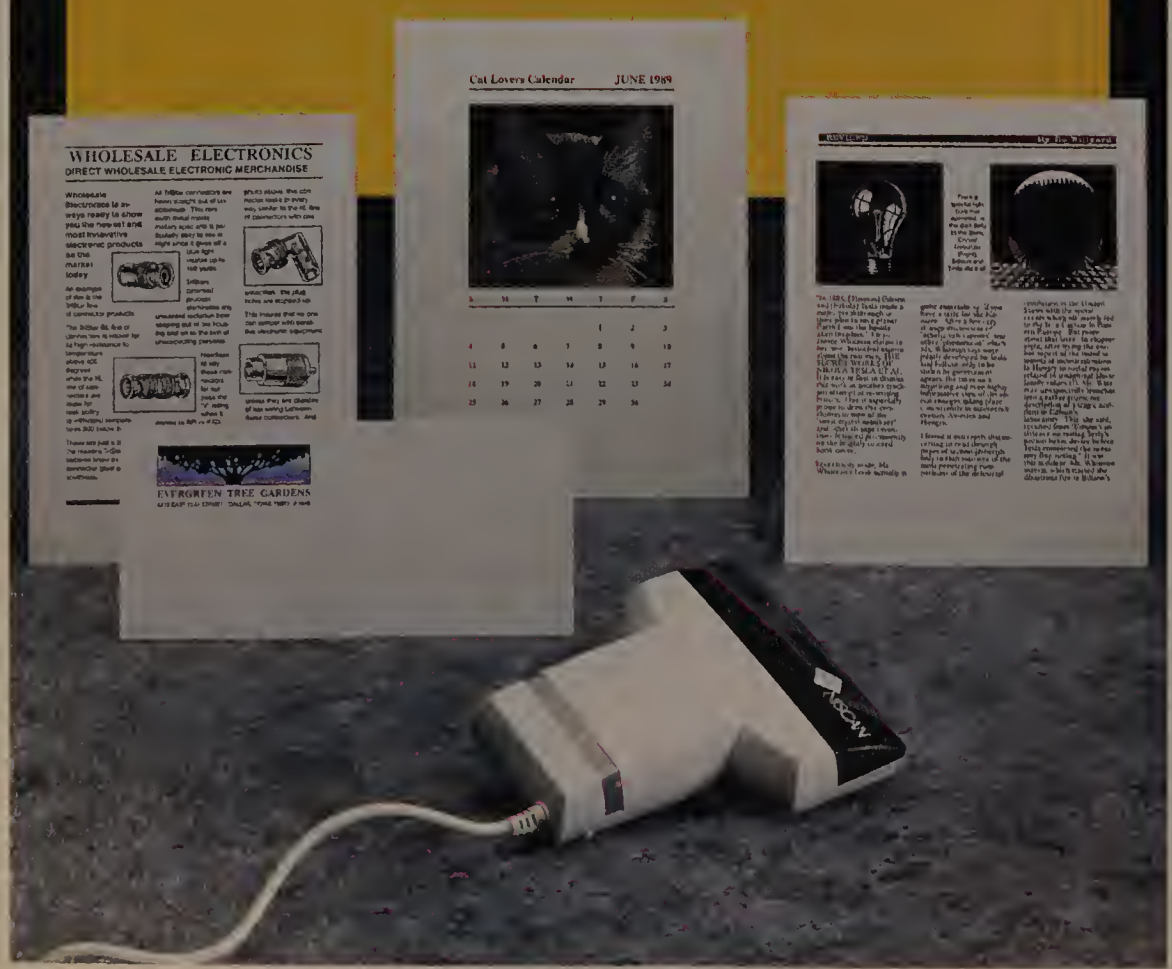

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ble Power." It can be expanded from a standard 2MB to 4MB.

The June *Software Shelf* review of *QuickC 2.0* incorrectly stated that Borland's *Turbo C 2.0* does not support mixed-memory models. It does.

Our *Product Outlook* item about Kyocera's A-800 scanner ("High-Resolution Scanning, Low Price Tag," *PCW*, June 1989) should have listed the company's toll-free number as 800/334-6056.

Power Tip No. 57 (*PCW*, July 1989) gave an incorrect version for *ProComm Plus*. The current version is 1.1b. *PC World* regrets these errors.

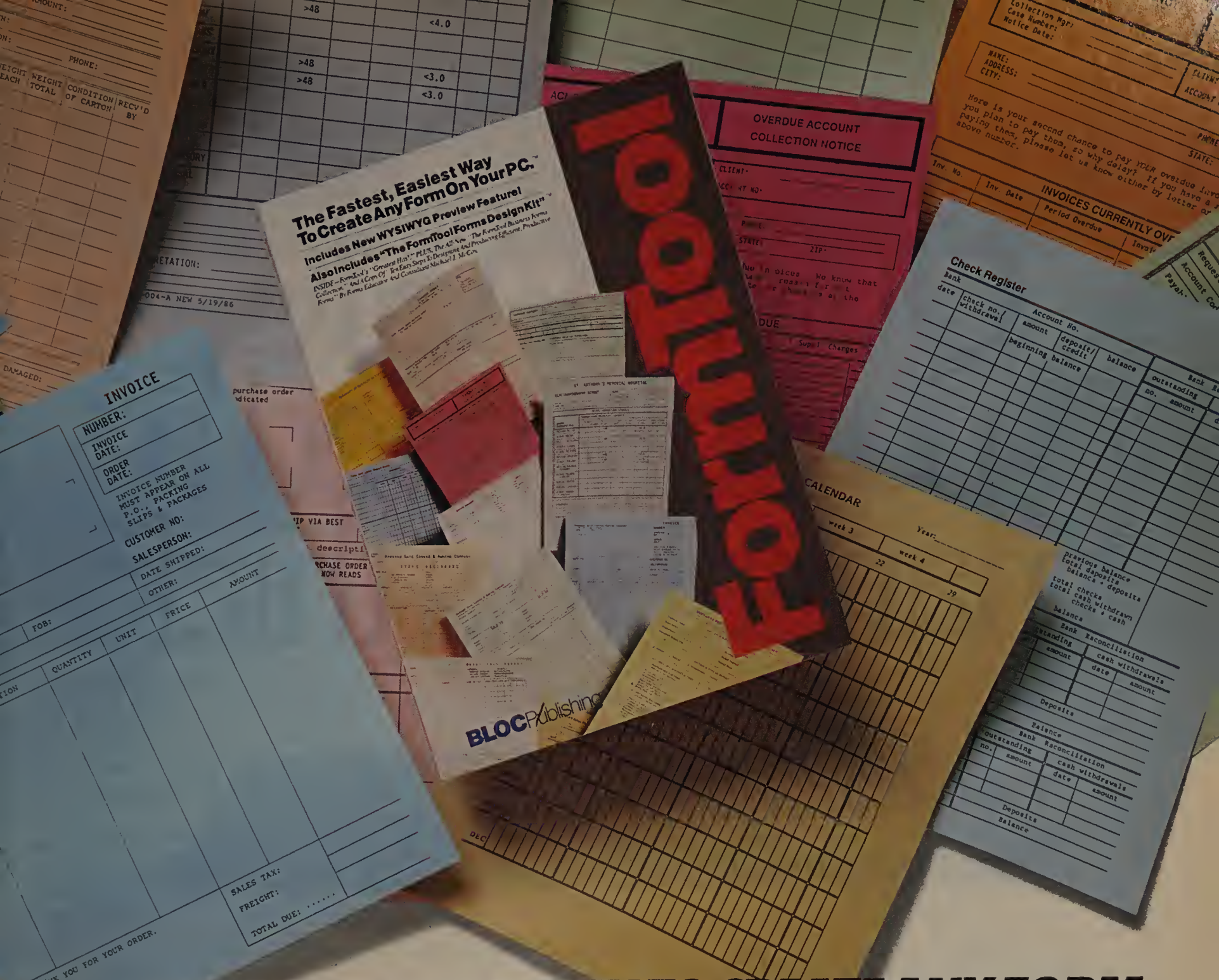
To send correspondence, please see How to Contact PC World, page 4. ●

POWER TIP NO. 65

How Big Is That Smartcom File?

Sometimes when you're in the middle of a *Smartcom III* session, you want to know how large a file is before you send it. Here's an obscure but useful *Smartcom III* toggle that displays file size in bytes, as well as date and time information, whenever you display a directory. Just press <F2> to display the main menu, press D for disk operations, hit the period (.) to choose special operations, and press F to turn on file detail.

Toru Tanaka
Los Angeles, California



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To learn Microsoft QuickBASIC, you only need a manual this thick.

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Another is the step-by-step tutorial that actually takes you through every stage of programming by working you through a complete program.

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THE HELP SCREEN

PC World offers answers and advice at every level

Format double-density disks in a high-density drive, preserve PIF files when reinstalling Windows, expand abbreviations automatically in just about any program, and create smart batch files that return to where they started.

Karl Koessel

ANTHONY RUSSO

Double-Density Format

Q. *I am responsible for several compatibles equipped with 1.2MB (high-density) 5¼-inch floppy drives. They can read 360K (double-density) disks, but I don't know how to make them* format *disks to 360K. Can you help? And while we're on the subject, how do I format a 3½-inch disk to 720K in a 1.44MB (high-density) drive?*

M. H. MacKay
Reading, Pennsylvania

A. Assuming the 5¼-inch drive is drive A:, use the command FORMAT A: /4 to format disks to 360K. To get 720K disks from a 3½-inch drive, use FORMAT A: /T:80 /N:9.

A word of caution: Although it doesn't happen frequently, 360K 5¼-inch drives may have trouble reading information written from a high-density drive to a double-density disk. Also, avoid formatting high-density disks to 360K. It's my experience that 360K drives are almost never able to read information written from a high-density drive to such a disk.

When PIFs Go Poof!

Q. *I recently upgraded my system's video adapter from an EGA to a VGA and discovered that I had to completely reinstall* Windows *for it to recognize the change. Although reinstallation appeared to proceed without any problems, I found that* Windows *had erased every one of my program information (PIF) files and installed its own collection of default PIF files instead.*

Windows *didn't care that the PIF directory already had PIF files. SETUP didn't ask me if I'd like the existing PIF files renamed, perhaps with the extension .OLD as it does for WIN-.INI. It just wiped away all PIF modifications I had made and didn't even mention the changes after the fact. I had to rebuild my PIF files one at a time. Did I do something wrong? Is there some way to run SETUP so it doesn't destroy existing PIF files?*

John Lewis
Indianapolis, Indiana

A. Using a PIF file is the recommended method for starting a standard (non-*Windows*) application under *Windows*. PIF files, which always have a .PIF extension, inform *Windows* about how each PIF's associated application uses the screen, system memory, drive directories, and other system resources, enabling *Windows* to run the application properly. Tinkering with PIF files is a necessary (albeit frustrating) part of fine-tuning *Windows* for your system and applications.

It is inexcusable for a program to brazenly discard an entire set of files you've created. And it's unfortunate that you don't have a backup of your PIF directory (which would allow you to simply restore your PIF files), but understandable if you normally exclude program files from your data backup.

To save you from the same grief the next time you reinstall *Windows*, log on to the PIF directory and use the DOS command ATTRIB +R *.* to make the files read-only. SETUP will not be able to erase or replace your PIF files. After the rein-

(continues)

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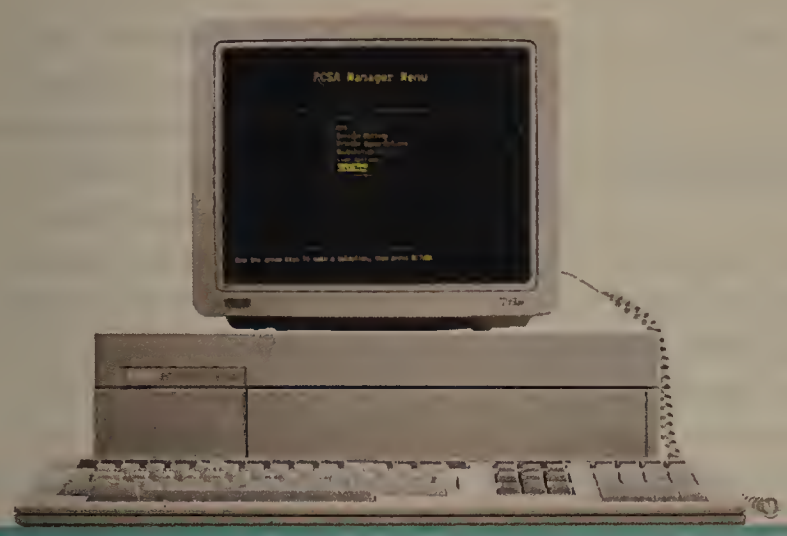

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stallation is complete, log on to the PIF directory again and use the DOS command ATTRIB –R *.* to remove the files' read-only attribute so that PIFEDIT can edit them.

For an extra measure of security, you can, like some *Windows* users, keep a copy of all your PIF files in another directory (for example, PIFBAK). That would allow you to simply copy those files into the PIF directory after reinstallation.

If you're reinstalling *Windows* for a new mouse or display adapter only, you can shorten the process by pressing <Ctrl>-X when prompted about printer or plotter installation. Ignore the message about *Windows* installation being incomplete, and rename WIN.OLD (in the *Windows* directory) WIN.INI.

Abbreviated Existence

Q. *Several years ago I purchased a program called* Jot, *which is described by its vendor, Beacon Software International, as a typing accelerator. It works with other programs, watching the text or data that you are entering and automatically spelling out any "abbreviations" it recognizes. For example, the keystrokes* ASAP *(followed by <Enter>, <Space>, or any punctuation key) would be expanded to* as soon as possible. Jot *is memory-resident and works well with other programs; I've used it with* WordPerfect, 1-2-3, *and several others.*

Jot *performs flawlessly on XTs and IBM's original 6-MHz ATs but simply does not work on faster (8-MHz and up) units. I'd like to get a new version that will work on the faster machines, but the vendor appears to have vanished. Can you offer any assistance?*

Robert B. Taylor
Salisbury, Maryland

A. Beacon Software's *Jot* is the enhanced version of Productivity Software International's original *PRD+* (also called *Productivity Plus*). Written by the same programmer, *Jot* was easier to install, easier to use, and had greater capacity. However, Productivity Software's current release, *PRD+* version 2.0, incorporates most of *Jot*'s re-

MP386

MP286

MP386e

mp286L

finements, including its easy-to-use interface. You can choose between Standard and Professional versions, which differ only in the number of abbreviations—or macros, since you can now also define <Ctrl>-, <Alt>-, and function-key combinations—that can be defined per word list (4000 and 8000, respectively).

Both versions come with 1000 macros for use with *1-2-3*, *Symphony*, *R:base*, *dBASE*, *WordStar*, *Paradox*, Pascal, BASIC, and the Hewlett-Packard LaserJet. The program also includes a collection of boilerplate text for business correspondence and a list of commonly misspelled words that the program uses to automatically correct typos (for example, changing *hte* to *the*) so quickly you don't even notice the error.

PRD+ is also available in some 20 special editions, each of which contains custom word lists. Among them are editions to help with legal affairs, medical transcription, construction industry terminology, and correspondence with NATO, the Department of Defense, or branches of the armed forces.

WHERE TO BUY

PRD+ 2.0
Productivity Software Int'l
1220 Broadway
New York, NY 10001
800/533-PLUS, 212/967-8666
LIST PRICE: Standard version $89.95, Professional version $129.95, special editions $149.95 to $179.95
REQUIREMENTS: 54K plus 15K to 20K for a particular word list, DOS 2.0 or later version
TECHNICAL SUPPORT: unlimited, toll-free number M–F 9–5
OTHER SUPPORT: none
Reader service no. 670

Round-Trip Batch Files

Q. *We're sure there's a way that a batch file can trap the current disk drive designator (A:, C:, or whatever) and that drive's current directory. With those capabilities, a batch file could change disk drives and/or subdirectories, perform its task, and return the user to the original drive and directory. We've looked everywhere, without success. Can you help?*

D. E. and W. A. Murray
San Jose, California

A. The batch file TO&FRO.BAT, shown in **LISTING 1**, demonstrates the technique. The batch file works by creating a second batch

(continues)

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```
@echo off
rem Create batch file to restore current drive and directory
copy  c:\utility\cdspace  c:\utility\getback.bat  >nul
cd  >>  c:\utility\getback.bat
cd\
cd  >>  c:\utility\getback.bat
rem Now change to another directory and drive
cd  \newdirec
echo  The default directory has been changed to
cd
a:
echo  Now the default drive has been changed to
cd
echo  To get back...
pause
rem Finish by restoring the original drive and directory
call  c:\utility\getback
```

LISTING 1: TO&FRO demonstrates how a batch file can restore the drive and directory that are the defaults when that batch file begins executing.

file, GETBACK.BAT, that contains the commands needed to return to the default drive and directory. The example assumes that drive C: has a subdirectory called \UTILITY, that the current default drive has a subdirectory called \NEWDIREC, and that there's a disk in drive A:. It also uses the @ symbol and the CALL command, features of DOS 3.3 and later versions; users of earlier versions must omit the @ and substitute the command C:\COMMAND /C for CALL.

TO&FRO relies on a small text file called C:\UTILITY-\CDSPACE. Create that file from the DOS prompt: Type **copy con c:\utility\cdspace**, press **<Enter>**, type **@echo off**, press **<Enter>**, type **CD** and a space, press **<Ctrl>-Z**, and press **<Enter>**. CDSPACE is a template comprising the first one-and-a-half commands of GETBACK.BAT.

After turning the echo off, TO&FRO creates GETBACK.BAT as a copy of CDSPACE. The >NUL at the end of the COPY command redirects the message '1 file(s) copied' to NUL (a reserved name for a nonexistent device, which simply accepts and discards input), keeping the message from cluttering the screen. The next line uses the CD command to report (not to change) the current default directory. But instead of displaying the full path name on screen, that line's double greater-than symbol instructs DOS to append CD's output to the end of GETBACK.BAT. Construction of GETBACK.BAT's second command, which TO&FRO will use to return to the original directory, is now complete.

Next, TO&FRO.BAT builds the command that will restore the original default drive. First, the command CD\ logs on to the drive's root directory. Then, another CD command is used again with the double greater-than symbol to add the name of the default drive's root directory as GETBACK's third and final command. The name of the root directory will work as a drive command because DOS ignores the backslash that trails the drive designator.

Then, just for show, TO&FRO.BAT changes to a new directory and then to drive A:. After a pause, TO&FRO.BAT calls GETBACK.BAT, the batch file it created, to change back to the original drive and directory.

How does...? What can...? Should I...? Send your PC questions to The Help Screen; *for details see How to Contact PC World, page 4.* ●

POWER TIP NO. 66

Good Housekeeping for WordPerfect Directories

WordPerfect's List Files command (<F5>) makes scanning a directory for dated files a snap. But as you clear out the old files, the directory becomes progressively harder to read because *WordPerfect* leaves holes in the directory list where the file names used to be. To quickly close the holes in the directory listing for faster *WordPerfect* housecleaning, simply press 0<F5><Enter>.

Sue Kim
San Francisco, California

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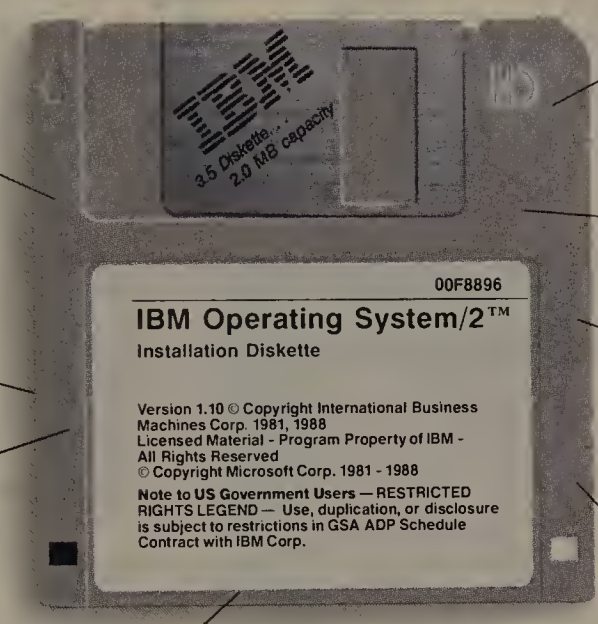

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REPORT TO THE FIELD

Shoe enough
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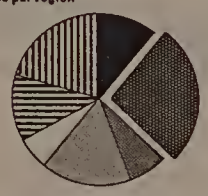
Sales per region



Northwest, Southwest, Northeast, Southeast, East, West, Midwest

Sales per region
Across the board it looks like the South once again led sales in FY '88. With the continuing pump craze those figures should maintain, if not improve. *2 Jim W.* It's important not to let the other areas such as Northeast and Midwest fall.

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Arbor Walker designed by Pier Bezio

SALES FORECAST FOR 1989 Types of shoes: Summer/Fall/Holiday/Spring

	1st quarter	*2nd quarter*	*3rd quarter*	*4th quarter*
Dress	95,000	87,000	120,000	60,000
Career	40,000	82,000	60,000	90,000
Casual	120,000	85,000	75,000	80,000
Sport	135,000	60,000	90,000	87,000
TOTAL:	390,000	314,000	345,000	317,000

1 Midgley C. 9/27/88, 4:32 PM
let's discuss forecast for media department expansion.
2 Jim W. 7/1/88, 1:15 PM
Figures for Northeast and Midwest should be calculated separately mid-month
let's catch them before they fall with promo.

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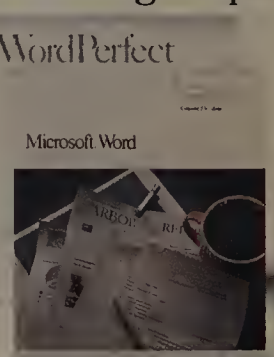

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Total	20	44

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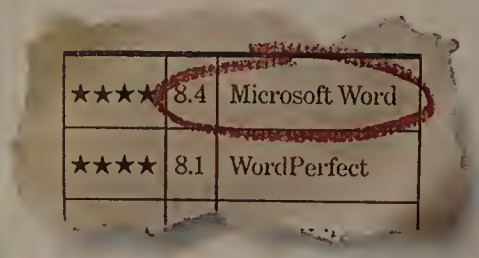

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WINDOWS JOURNAL

First-hand dispatches from the Windows front

Why is the most popular category of Windows software made up of stuff that modifies and "improves" Windows itself?

Stewart Alsop

Some time ago, in another life, I wrote a column about my worst nightmare—reviewing DOS shells, those little programs like *Norton Commander*, *Xtree*, and others that try to make the operating system more usable for human beings.

The problem is that every programmer thinks he or she can design a better user interface than the operating system's creators did. But every programmer has a different idea of what's good, leading to a situation where the differences themselves become the problem. The worst part is, every shell programmer religiously believes his way is right and that he should convert every industry analyst and writer to his point of view. I call that Shell Hell.

Shell Hell is back, only this time it's moved from DOS to *Windows*. The basic urge represented by those DOS shells—to improve upon Microsoft's work—hasn't been blunted by *Windows*' supposed ease of use. Instead, the single most popular category of *Windows* software belongs to programs that "fix" real or perceived problems in *Windows* itself.

The fundamental problem these programs try to solve is that the MS-DOS Executive—the *Windows* program used to manage files and navigate directories—isn't very exciting for a modern graphical interface. Perhaps Microsoft deliberately underpowered it so customers could differentiate their systems. Or perhaps Microsoft was too busy working on OS/2 or on *Windows*' memory management. But MS-DOS Executive doesn't do anything DOS doesn't already do, and DOS doesn't do very much beyond some simple file management.

So far, I've come across six *Windows* shells: *PubTech File Organizer*, *Command Post*, *Windows Manager*, *NewWave*, *Clearview*, and *Prompt*. It's impossible to evaluate these products without using them for some time, since you can use only one at a time, and you don't discover their eccentricities until you run into those odd situations that tax any program. So I haven't yet evaluated *Clearview* from Wang Labs or *Prompt* from Access Software. But here's what I think of the rest.

PubTech: Too Close for Comfort

The first *Windows* shell I used was *PubTech File Organizer*. Given my Macintosh experience, I thought that *PFO*'s Mac-like approach would be just right. Icons on a desktop represent files and programs. You launch programs by clicking on an icon or selecting an associated file from a directory listing.

But *PFO* lacks the Mac's coherent way of doing things. For example, double-clicking sometimes installs an icon onto the desktop and sometimes launches a program. There's probably a rule explaining when it does which, but I never found it (being an aggressive nonreader of manuals).

Other *Windows* users I've spoken to about *PFO* swear by it; they've probably never used another graphical shell and aren't confused by *PFO*. In addition, *PFO* works best if you disable the MS-DOS Executive (by changing a line in the WIN.INI file). But I'm uncomfortable giving up a standard part of *Windows*, even if it is substandard.

(continues)

ANTHONY RUSSO

Command Post: Windows-Friendly

Command Post is probably the least intrusive and most widely used *Windows* shell around. A shareware product, it enhances the MS-DOS Executive by adding four new menus and some other features. The Windows menu lets you activate and arrange windows. The CmdPost menu invokes several utilities. The Desktop and Applications menus are entirely user defined through an editable text file. You also get a desktop clock and screen saver.

I like *Command Post* primarily because it is friendly to everything else. Since it is an extension of the MS-DOS Executive, it doesn't interfere with other programs. And it doesn't throw what you've already learned about *Windows* out the...window.

Windows Manager: Desktop with Utility

My other favorite *Windows* shell is hDC's *Windows Manager*. I like it because it adds the concept of desktop utilities to *Windows*. Desktop utilities are small programs that help you manage your desktop or disk or time or whatever. Macs include several such "desk accessories" for installing new fonts or utilities and choosing network resources such as printers or servers. *Windows Manager* adds all this to *Windows* (and fits in quite well with *Command Post*). It comes with seven utilities, including the visual memory map I asked for in *PC World*'s July issue.

A lot of people say you don't need special ways of handling utilities in a multitasking environment, since utilities are just little programs. But I've discovered it's useful to organize utilities in a consistent fashion so you always know where to find them. That's what *Windows Manager* does.

NewWave: Software That Thinks Like You Do?

Users still can't get their hands on the infamous and much-heralded *NewWave*, the program that caused Apple Computer to sue HP and Microsoft. The environment is now in beta testing and will become available this fall. *NewWave* is overkill if you use existing *Windows* programs and want some new file-management features. But if you use *NewWave* applications (which are *Windows* programs modified to use some of *NewWave*'s special features), you will discover a entirely new way of working with a computer.

NewWave is object oriented. That means the system keeps track of how programs, data, and resources work with each other. When you use *NewWave* programs, you never see "software" and you never see files. Instead you see compound documents.

Think of how you read documents on your physical desktop: Your brain automatically goes into word processing mode when you read text and into graphics mode when you look at pictures. *NewWave* is similar. If a document includes both text and graphics, you actually use the text editor to change the text and the drawing program to change the graphics. But it looks like you're just editing the document. Even though the document is made up of different kinds of data managed by different pieces of software, it all looks and acts the same.

You can also ask *NewWave* to remember what you do; it will keep a journal of your actions that you can play back to automate recurring activities. HP calls these journals *agents*, which is really a fancy word for what users have been calling macros or scripts ever since Lotus delivered *1-2-3* release 1A.

Wanted: Computing Without Rules

I'm sure I'll get a couple of angry letters from readers who use other shell programs or who actually think the MS-DOS Executive is fine. All right, already! My main point is that a successful system approaches similar tasks in a consistent way. The whole idea of graphic interfaces is to help users spend less time worrying about the computer and more time worrying about work. And the biggest time waster of all is trying to remember exactly how you're supposed to do something that doesn't quite fit the rules. In fact, as *NewWave* seems to promise, the biggest time-saver will be the system that doesn't ask you to remember any rules at all. ●

Stewart Alsop is editor and publisher of P.C. Letter *and a contributing editor for* PC World.

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Edited by ERIC BENDER

Pros Adopt Compatibles

dBASE Community Rocked by Developer Discontent

Separated by a Common Language

Nantucket's Larry Heimendinger will slowly move Clipper away from the dBASE language.

DAVID STRICK

Larry Heimendinger had just unveiled the new version of *Clipper*, Nantucket's dBASE compiler, when an earthquake rocked the floor and set the chandeliers rattling.

"I told you that this is a fabulous product," cracked the Nantucket chief executive, looking skyward. The thousand developers in the audience must have concurred, because all but a handful were still in their seats a few minutes later when a large aftershock rolled through the hall. But then, the hardened veterans of last year's disastrous dBASE aftermarket don't scare easily.

They were in Los Angeles on a mission: to find a way to survive and thrive with dBASE next year. Many had also packed the Valley West dBASE User Group's dDay developer/user fair, which drew 500 attendees the weekend before. The strength of both events testifies to the popularity of the dBASE language. An estimated 90,000-plus dBASE language programmers have built some 10,000 commercial applications and untold thousands of in-house applications.

But as the *Clipper* conference showed, interest does not equal satisfaction. Lawsuits, delayed *dBASE* updates, and profit dives for add-on developers and Ashton-Tate alike have sent shock waves through the community. There are more than a few scuffles among *dBASE* devotees these days, and dissatisfaction with Ashton-Tate's plans spills from every conversation.

"Ashton-Tate has been shooting itself in the foot for a long time," declares Tripp Micou, director of the 1500-member dBASE Language User Group of the Boston Computer Society. "Now it's starting

(see dBASE, p. 56)

Caere Package Redefines Desktop Text Recognition

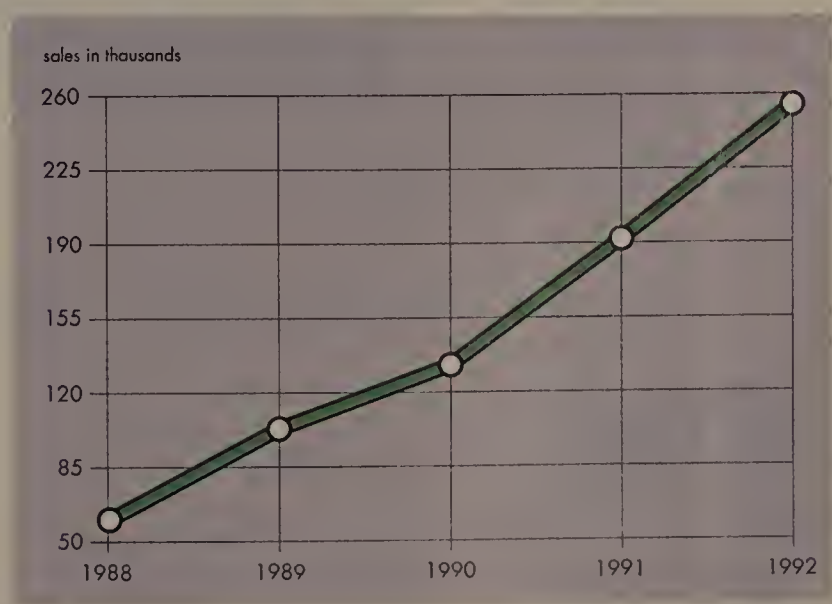
Saving 'Disenfranchised' Data

In text recognition, the road to success is paved with failed vendors. It's not that users like to retype information. As Caere chairman Robert Noyce points out, "you seem to spend most of your time with a personal computer just putting data in." The problem has been creating technology that's good and cheap.

Better known for pioneering integrated circuits and cofounding Intel, Noyce put Caere together in the mid-1970s. The original target was point-of-sale systems, and the big question, says

(see Caere, p. 58)

Desktop Scanners Take Off



Desktop scanners are poised for steady growth, predicts CAP International. While a majority will be sold primarily for desktop publishing, text-recognition applications will benefit from the installed base and help to fuel sales.

dBASE

(continued from p. 55)

to point the gun at its head."

Unlike user-driven applications such as *1-2-3*, and despite Ashton-Tate's claim to be the only legitimate custodian of the language, *dBASE* has long depended upon the kindness of strangers for its vitality. Early on, third-party developers and consultants got behind the product and pushed its inscrutable dot prompt past other technologies. These evangelists continue to expand its features, but many are experiencing a crisis of faith.

"We're here because we're dissatisfied with the industry leader," asserts Christopher Edgar, an insurance industry consultant and head of a Hartford, Connecticut, *Clipper* user group. "We're trying to find other ways to serve our companies and clients because we aren't getting support from Ashton-Tate."

Heimendinger claims that many of the 3 million *dBASE* users would be surprised to learn that their applications were not developed with *dBASE* itself, but in *Foxbase*, *Clipper*, or another dBASE language–compatible product.

Nantucket and Fox Software, the most prominent third parties, have charted courses away from the language in order to free themselves from Ashton-Tate's technical, legal, and marketing turbulence. Fox, located in Perrysburg, Ohio, will make its new *FoxPro* a radical departure in terms of interface and command set. Los Angeles–based Nantucket is turning toward object-oriented programming (OOP). Its newly-launched *Clipper 5.0* is only the harbinger of a full-blown OOP product planned for early 1990, which will offer the ability to switch back and forth between OOP and conventional procedural techniques.

Ashton-Tate's inability to ship *dBASE IV* froze sales for third parties last year, says Heimendinger. When finally released, the package was slow, buggy, and a glutton for memory. The product is still languishing on distributor shelves; Ashton-Tate revenues dropped 39 percent from the first quarter to the second quarter (ended June 30), with an accompanying $15 million loss. Third-quarter prospects are no brighter, since version 1.1 has been delayed from April to possibly as late as September.

dBASE IV is big and slow, observes data base lecturer Adam Green, because Ashton-Tate tried to grab yet more market share by jamming in too many of the add-on features offered by third-party products. Ashton-Tate chief executive Ed Esber counters that users asked for all those features, and asserts that developers' motives "are not to promote the dBASE language but rather to promote their own economic well-being."

Some of Nantucket's own third parties lodge a similar market-gobbling complaint against *Clipper Tools*. But while Nantucket tries to work out its differences with third parties, Ashton-Tate has "dammed up the river," declares leading dissident Tom Rettig of Tom Rettig Associates in Beverly Hills, California.

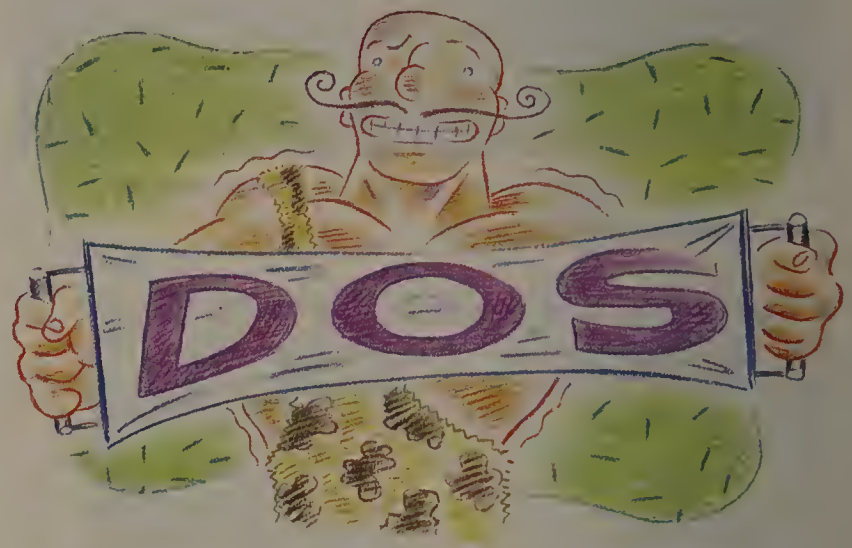
Heimendinger claims that more than 100,000 copies of *Clipper* have shipped. But with only $1.4 million in profits on $17 million in 1988 revenues, his company is not about to snatch market dominance from the $307 million Ashton-Tate. Still, the Torrance, California, giant will have to deliver a clean version 1.1 if it is to bring developers back into the fold.

"They own the hands of the data entry people and the main body of users, but they have lost the hearts and minds of programmers," insists Green. "If it weren't for compatibles, *dBASE* would be losing market share very fast, because all those who left for the compatibles would have left the language completely."

—*Mike Hogan*

DOS Extenders Flourish as Vendors Reduce Conflicts

But Microsoft Balks at Standard



BUD PEEN

Three years ago, small software houses quietly began to release DOS extender tools, which give developers a clean way to break the DOS 640K memory barrier on 80286 and 80386 machines. The tool suppliers expected only a limited window of opportunity; when OS/2 arrived, "we thought we would have to go on to other things," recalls Ben Williams, vice president at Rational Systems in Natick, Massachusetts.

But it hasn't turned out that way, and DOS extender technology has been embedded not just in a trickle of specialized engineering packages but in major applications: *1-2-3* release 3, *AutoCAD*, *Paradox*, *Foxbase*, and many others.

DOS extenders tailored for the 386 cannot only exploit full 32-bit processing power (which OS/2 won't begin to do until next

(see Extenders, p. 60)

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Caere

(continued from p. 55)

Noyce, "was whether the technology had reached the point of being practical. The final answer was no," he adds, laughing.

"I've never started a company that stuck to its original concept," Noyce remarks, and Caere went off to prosper in other niches, first with hand-held scanners and then bar-code equipment. But two years ago, Caere's engineers embarked on another quest for a text recognition hit. Last year the Los Gatos, California, firm produced one.

Caere's OmniPage doesn't boast a 100 percent recognition rate—no text recognition system does, even dedicated systems that cost tens of thousands of dollars. But it can read text from an extremely wide variety of scanned documents at up to 115 characters per second and save the text in several popular file formats. Unlike many text-recognition packages, OmniPage doesn't require users to "train" it on a given document. It employs *Windows* for ease of use and gives quick feedback on its progress.

OmniPage costs $2495 with a coprocessor board for ATs, $895 in a software-only version for 386s with 4MB of memory. Caere president Robert Teresi agrees that such a 386 doesn't come cheap but points out that "you can use it for other tasks—unlike the board."

"Caere has reshuffled the industry with a product that can handle many, many kinds of documents quite effectively at a desktop price," says David Marshak, senior analyst at Patty Seybold's Office Computing Group in Boston.

Most customers use OmniPage for office duty, not publishing, notes Caere's Larry Miller.

ANNE HAMERSKY

While Caere expected desktop publishers to lead early OmniPage adopters, it found 70 percent of users doing general office duty, says Larry Miller, director of office products. That means the system is quickly finding its proper niche in the paper chase—handling the "economically disenfranchised" data that you can't file physically but may need a month or a year from now. "Remember the last scene in *Raiders of the Lost Ark*—that huge warehouse?" asks Miller. "That's where résumés go."

All-terrain text recognition remains a daunting technical challenge for new entrants, but Caere faces strong rivals in California-based veterans Calera Recognition Systems (formerly Palantir) of Santa Clara and Xerox Imaging Systems of Mountain View (which grew from Kurzweil Computer Systems and Datacopy). Both firms now offer PC text-recognition hardware-and-software packages for under $3000.

"In this market, vendors generally team up," notes Cathy Dingman, analyst with CAP International in Norwell, Massachusetts, and such partnerships may make or break text-recognition suppliers. OmniPage received instant prominence by debuting a Macintosh version alongside Apple's first scanner; Seybold's Marshak now sees a need for deals with IBM and other major players.

Teresi cautiously predicts that in two years OmniPage could double Caere's sales, currently in the $18 to $20 million range. "Caere has been around the track; it has a lot of scar tissue," Noyce adds. "The surprising thing is that it's had a positive cash flow for years." —*E. B.*

DCA Broadens Offerings as IRMA's Star Fades

Gateways Replacing Emulation Cards

Digital Communications Associates built a $200 million–plus empire by cobbling together a diverse line of communications gear—everything from *Crosstalk* software to high-speed modems. But last year, when financial results suddenly turned shaky, DCA's second-ranking executive left, and rumors of a buyout raced along Wall Street, analysts blamed one culprit: IRMA.

Launched in 1982, IRMA was the first hardware/software combination permitting a PC to emulate an IBM 3270 mainframe terminal—then the most common desktop hardware for corporate computing. IRMA both opened the market and became an enviable cash cow, accounting for more than two-thirds of DCA's revenues and profits.

Last year, though, IBM focused on 3270 board sales for the first time. "DCA was caught asleep at the wheel, and it really lost a good bit of market share," says Leslie Lord, an analyst with International Data Corporation. Her figures show IBM selling 155,000 boards, DCA only 138,000.

"Perhaps there was a little arrogance on our part," says Howard Laff-

(see DCA, p. 60)

What we lost in pounds we gained in power.

When the readers of PC World magazine once again voted our lightweight T3100 "Top Laptop," we were flattered.

And when PC Week gave it their Corporate Satisfaction Award, we were equally honored. Everyone seemed to agree it was perfect.

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T3100e: 12MHz 286 with 80287 coprocessor socket, internal half-length IBM slot, 20MB hard disk with 27msec access, 1MB RAM expandable to 5MB, gas plasma display, 1.44MB 3½" diskette drive.

In Touch with Tomorrow

TOSHIBA

Toshiba America Inc., Information Systems Division

Circle 256 on reader service card

Extenders

(continued from p. 56)

year), they can be multitasked via Quarterdeck's popular *Desqview/QEMM* combo. But the various suppliers of DOS extenders and 386 control environments took different approaches to memory management—raising the possibility that applications might squabble as unhappily as memory-resident packages do.

To avoid such a mess, Rational, Phar Lap Software, Quarterdeck, Lotus, and others wrote a specification last spring that covers the way both DOS extenders and expanded-memory control packages use 386 memory.

The one hitch is that Microsoft—a major force thanks to DOS and *Windows/386*—failed to endorse the standard. "We very much need Microsoft to get on board," says Frank King, Lotus's vice president for software products. "From the customer's point of view, it would be nice to take this issue off the table."

Microsoft will take an alternate approach to extended memory this fall in a major revamp of *Windows/386*. However, it's talking with the 386 standards group, and, says Rational's Williams, "if there is a way for us to support *Windows* products, we will."

Resolution of this issue will affect more than a few customers, and for more than just a year or two. "The practicalities have to outweigh OS/2's elegance or claims to perfection," says Williams. "It's hard to imagine something that will make people stop running DOS." —*E. B.*

DCA

(continued from p. 58)

ler, president of DCA's personal computer communications group. "We've learned our lesson." Among changes, he cites the new IRMA 3 board, which cuts costs, runs DCA or IBM emulation software, and fits standard PCs and Micro Channel Architecture PS/2s.

Although analysts doubt this last feature matters much, they generally predict IRMA 3 will win back market share. But DCA's problems "are more than market share shift," says Eric Buck, vice president at Donaldson, Lufkin and Jenrette in New York. "The market for micro-to-mainframe links is fully matured—in a steady and irreversible decline."

IDC's Lord is more optimistic, predicting 5 percent compound annual growth in shipments for the next five years. But she agrees that a fundamental technological shift is under way, with PCs beginning to connect to mainframes through network gateways rather than individual emulator boards. "It's just more economical," says Lord, who forecasts that unit sales of such gateways will grow at a 27 percent annual rate.

Sales of micro-to-mainframe boards will remain healthy for years, says DCA's Howard Laffler.

STEPHEN FERRY

Networks are old news to DCA, which began offering gateway products three years ago. In early 1988 the company undertook a massive development project for a powerful *OS/2 LAN Manager* gateway. This turned into a joint effort with Microsoft, which will license the technology to other suppliers. The first version should arrive late this year.

"They're betting the bank on the success of this next-generation product," Lord says. She cautions, however, that "it depends on the success not only of OS/2 but of *LAN Manager*, and that market hasn't heated up yet." When it does, DCA will butt heads with IBM, 3Com, and Novell.

Even if the DCA gateway does well, Buck notes, it won't make up for IRMA sales if the cost to connect ten users runs around $12,000 via IRMA but only $4000 via a gateway. "This is not incremental business but something DCA has to do if it wants to hold on to a quarter of the business."

Meanwhile, DCA continues to search for another star. A move into very-high-speed modems and other wide-area-net products hasn't met expectations, in Buck's view. Neither has the 1987 purchase of Fox Research and its 10Net LAN. Fox's aggressive entrepreneurs "were going to be Novell and 3Com killers, and we let them run hands-off for the first year," Laffler says. "They found that those two companies were very formidable." 10Net now targets overseas markets and security-conscious buyers with its fiber-optic hardware. "That's a decent little niche, but not a big revenue-gathering business," remarks Buck.

So although DCA's strategy seems sound, "there's been some stumbling along the way," Buck says. Fortunately for the company, during the next few years IRMA will remain "a nice comfortable market," says Lord. "It's taking some risks, but I think DCA is on the right track." —*E. B.*

Mike Hogan is PC World's *news editor.* ●

TWO-FISTED MANAGEMENT
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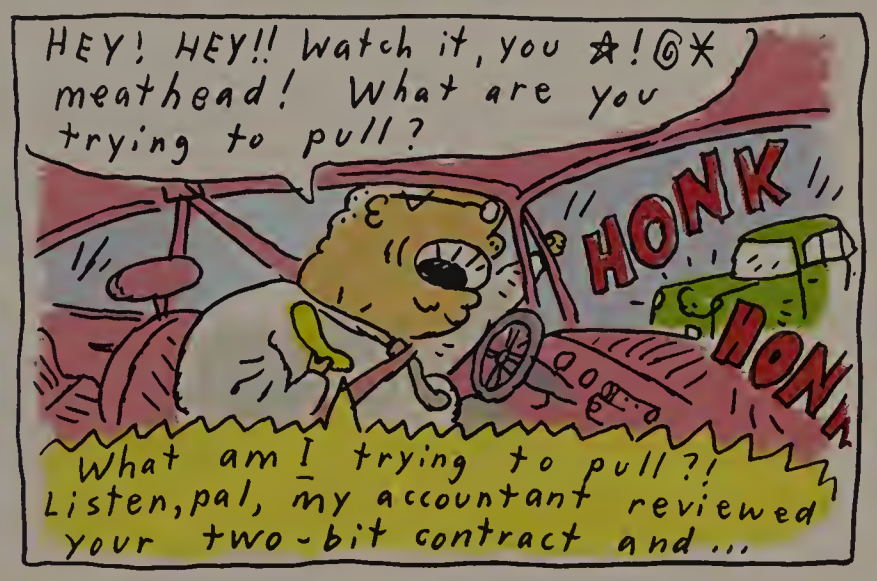
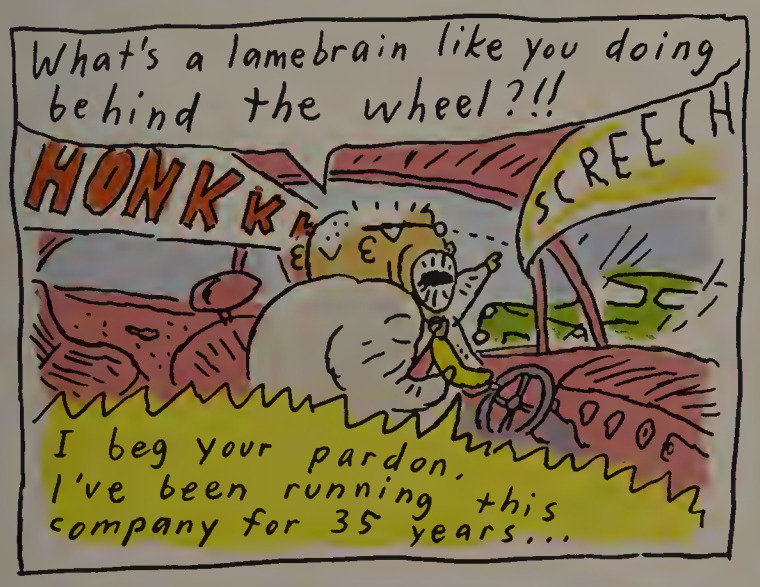
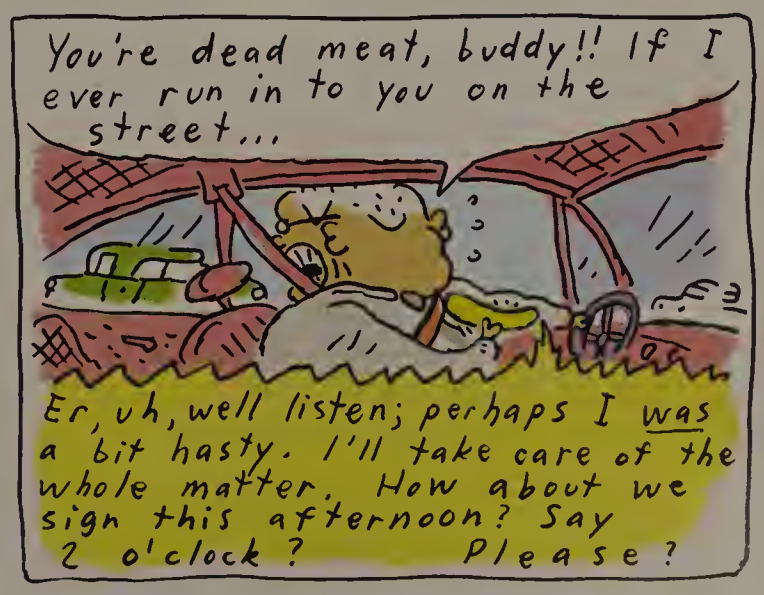
Good morning, Ms. Verner. Any calls?
Why, yes, Mr. Harris. A Mr. Bellini from P.P.J. Enterprises called. He seemed extremely irate, sir.
Damn! Don't tell me the P.P.J. deal is off track!

Hello, Mr. Bellini; this is Arnold Harris
SCREECH
Yeh, Harris! I want outta the deal!


HEY! HEY!! Watch it, you ★!@✱ meathead! What are you trying to pull?
HONK
HONK
What am I trying to pull?! Listen, pal, my accountant reviewed your two-bit contract and...


What's a lamebrain like you doing behind the wheel?!!
HONKK
SCREECH
I beg your pardon. I've been running this company for 35 years...


You're dead meat, buddy!! If I ever run in to you on the street...
Er, uh, well listen; perhaps I was a bit hasty. I'll take care of the whole matter. How about we sign this afternoon? Say 2 o'clock? Please?

Where would I be without my cellular phone?
HONK!
HONK

MARK MAREK

People who use the new Lotus 1-2-3 wil

ccomplish more than ever before.

Introducing the new Lotus spreadsheet is now bet

The arrival of the new Lotus® 1-2-3® Release 3 and Release 2.2 will come as good news to business.

Because Release 3 and 2.2 are the two most powerful, versatile spreadsheets in the world.

Which version of 1-2-3 is right for you? Well, that depends on what hardware you're using and what requirements you have.

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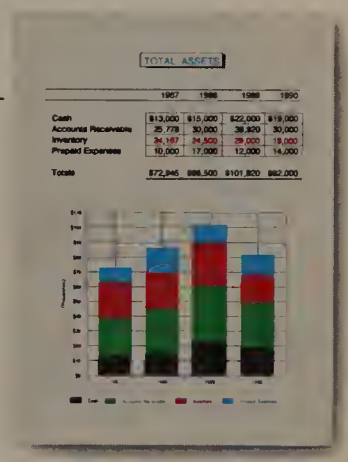

Release 2.2 offers presentation quality output and extra-ordinary speed.

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Lotus and 1 2-3 are registered trademarks of Lotus Development Corporation OS 2 is a registered trademark of International Business Machines, Inc dBase III is a registered trademark of Ashton Tate Corporation PostScript is a registered trademark of Adobe Systems, Inc 1-2 3 Release 3 runs under DOS or OS/2 Hard disk and 1 Mb system memory required in DOS, 3 Mb in OS 2 Lotus certified compatible PCAT with 80286 80386 processor required Release 2 2 runs on Lotus certified PCs of all types in DOS with a minimum of 320K system memory 512K and hard disk required with Allways

IBM Kicks Off the 486 Race

IBM jumps the gun on 486 announcements—but can expect tough competition by the time its upgrade actually arrives.

Eric Bender

How much will PCs built around Intel's new 486 microprocessor cost, and how will they perform compared to today's top-of-the-line 80386 models?

Surprisingly, the first specific answers come from a company that hasn't led the PC performance parade in recent memory. IBM will charge $3995 for a 25-MHz 486 upgrade to its PS/2 Model 70-A21 386 machine, and claims the upgraded unit will crank through tough number-crunching tasks twice as fast as a 33-MHz 386 PC with a math coprocessor.

Now for the reality check: Intel hasn't actually finished building the 486 yet. IBM, which now typically unveils its fastest PCs months before they ship, doesn't expect to deliver until the fourth quarter. However, the company claims that the 486 is close to final form and backed up that claim in June by showing more than 20 prototype systems running application software.

The 486 chip runs all the same software as the 386 without modification, and the prototype IBM machines act just like extremely fast 386s. The chip itself provides two to four times the raw performance of the 386 at a given clock speed (and while the 386 is likely to top out at 33 MHz, Intel plans to eventually boost the 486 clock to 50 MHz).

IBM's 486/25 Power Platform replaces the PS/2 Model 70-A21's 386, memory cache, cache controller, and math coprocessor with a much more powerful 486 CPU.

STEPHEN FERRY

Take a Card

In addition to a built-in memory cache, cache controller, and 387 coprocessor, the 486 includes a host of power features that system manufacturers are not likely to exploit fully for awhile. On the other hand, vendors can leave their 386 architectures almost untouched—an approach that IBM's upgrade takes to an extreme. The PS/2 486/25 Power Platform is a computer on a card that includes the 486, a crystal, and a sprinkling of logic chips; it replaces the 25-MHz CPU card that plugs onto the A21's motherboard (slower 386 PS/2s can't accept this upgrade).

You don't need card-sharp skills to install the Power Platform. Dealers can make the swap in a few minutes without tools by pulling off the cover, taking out the floppy and hard disk drives, removing a structural piece and the hard disk interface, replacing the processor card, and then reversing these steps. Finally, two BIOS chips are upgraded and the system software

PC World previews are informal assessments of products that at press time were still in the development stage. Complete reviews—including features evaluations and definitive performance testing—will appear only after a product is officially released.

is reconfigured (the 386 card goes back to IBM).

According to our preliminary tests, business applications run up to twice as fast at they do on the original A21. IBM claims the production units will perform identically to the prototype; further engineering will merely correct a few dozen remaining glitches.

IBM has cut the A21's starting price to $8995, so an upgraded base system with a 120MB drive will list for $12,990. By comparison, a Compaq Deskpro 386/33 with an 84MB drive costs $10,499. Pricing estimates for future 486 systems range upward from $10,000; the chip itself costs system vendors $950 in bulk.

SNAPSHOT

PS/2 486/25 Power Platform

IBM's processor card will bring the punch of Intel's new 486 chip to the PS/2 Model 70-A21 386.

KEY FEATURES

- **Easy dealer upgrade**
- **Boosts throughput on business applications by up to 100 percent**

AVAILABILITY

Scheduled for fourth quarter

PRICING

$3995

IBM
900 King St.
Rye Brook, NY 10573
(Contact your IBM dealer)

Reader service no. 705

Not surprisingly, IBM expects to ship a standalone box at about the same time the upgrade appears, although no details were provided at press time. Why, then, an upgrade announcement in June? IBM says the company aims to let customers know about an important benefit. Rivals insist that the gambit is intended to bolster the A21, which took a long time to ship in volume and then suffered from an acknowledged defect in 15 percent of its hard drives. Competitors also note that the A21's limitations—a maximum of 8MB of memory on the motherboard, a meager three slots, and a hard disk that's sluggish compared to its peers—make it a less than perfect springboard for the 486.

Of course, the first vendor to disclose plans to reach the next performance plateau is not always the first vendor to ship. With the 486 arriving ahead of schedule and in unexpectedly polished form, other manufacturers may be expected to react quickly. AST, for instance, announced a similar upgrade two weeks after IBM. Compaq leads the 386 market, but every other major player is also in the blocks, and we'll probably see a photo finish.

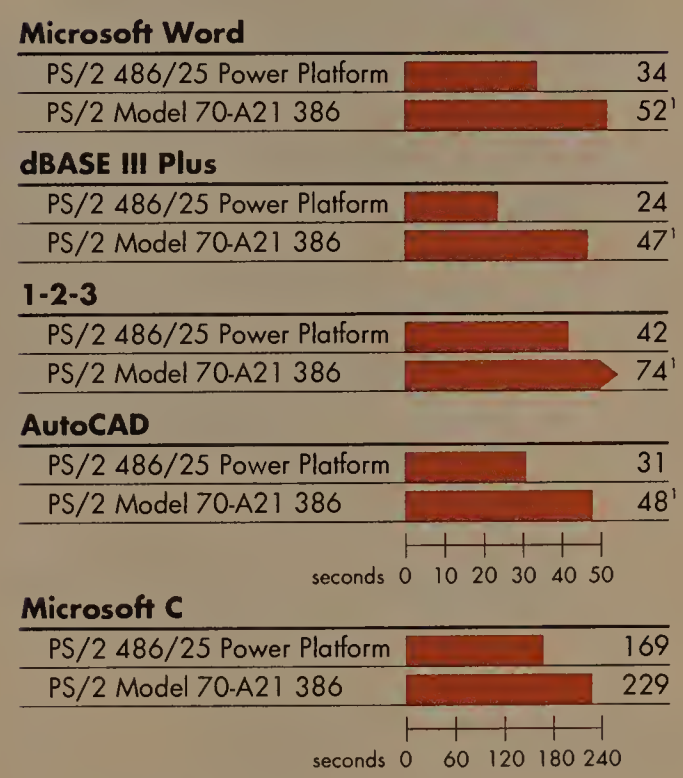
When the dust settles and the noise from the marketing crowd subsides, the 486/25 Power Platform will be pushed aside by systems tailored for the 486. It still may merit a footnote in history, though, as the first-announced *desktop* 486. Despite all the talk that 486 machines will debut as network servers or multiuser machines, IBM and other suppliers are now betting that large numbers will be snapped up by individual power users. ●

Eric Bender is PC World's *East Coast editor.*

NSTL TEST REPORT

Pushing Up the Power

Preliminary tests show the 486 upgrade giving a healthy boost to the Model 70-A21.



[1] With 80387 numeric coprocessor.

Methodology
For details, see "The 32-Bit Question: 286 or 386SX?" in this issue.

Data based on tests designed and conducted by National Software Testing Laboratories (NSTL). All rights reserved.

Some views on why the NEC MultiSync

There's a lot more to the new MultiSync® 3D monitor from NEC than meets the eye. Because instead of making one monitor for each graphics board, we've developed a monitor that enhances the performance of the modes on practically *any* board.

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Computers and Communications

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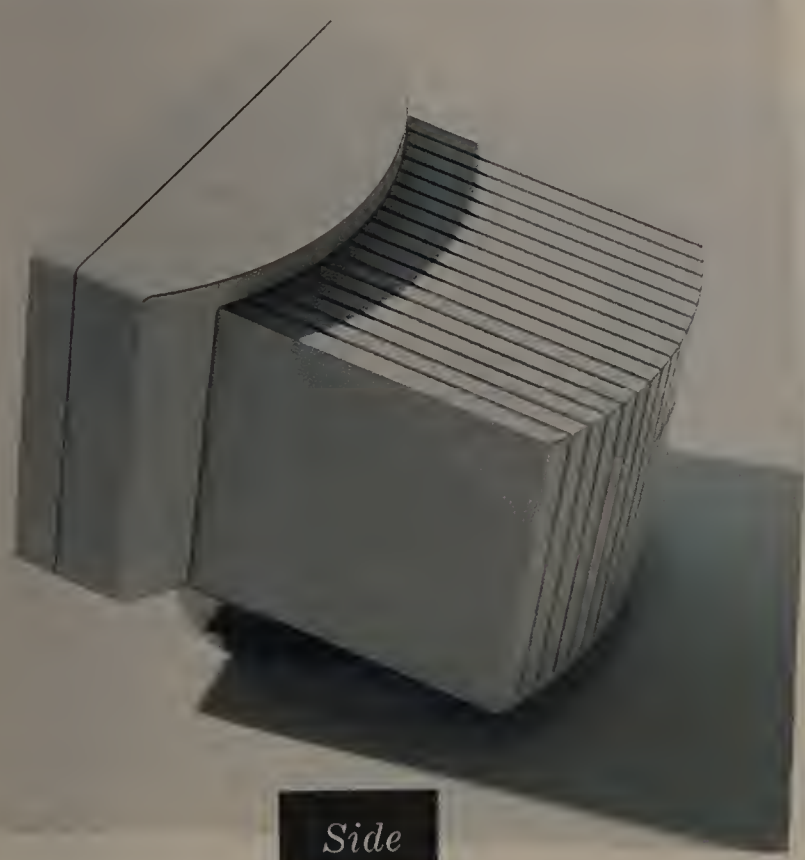

Side

Top

has dramatically raised the standards by which all other color monitors will be judged.

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Circle 171 on reader service card

Crosstalk Spiffs Up Its Interface

Crosstalk for Windows delivers most of the power of the popular communications package —with a stylish, easy-to-use interface.

Eric Brown

Communications, the last refuge of bit-twiddlers, cries out for Microsoft's *Windows* environment. A mouse is quicker than a keyboard for selecting parameters or phone-book entries. And once you've established a communications link, *Windows* multitasking lets you get back to other work even when files are still coming down the line.

Future Soft Engineering's *DynaComm* has been the sole entry among *Windows* communicators (see the review in the *Windows* Special Report, *PCW*, August 1989). But DCA/Crosstalk's *Crosstalk for Windows*, whose features and interface are slightly more advanced than those of *DynaComm 2.0*, should have appeared by the time you read this.

In functionality, *Crosstalk for Windows* is closer to *Crosstalk Mk.4* than to *Crosstalk XVI*, but it lacks *Mk.4*'s numerous terminal emulations and support for multiple sessions. Its script language, though sophisticated, is a subset of *Mk.4*'s CASL programming language. Non-*Windows* users should note that *Crosstalk* lacks a run-time version, so they'll have to buy *Windows*.

During a CompuServe session, a user takes a break to edit a CompuServe script using Windows Write. The Crosstalk for Windows display (scaled down here) includes a function key template that shows available user-defined macros.

Easing Into Windows

Crosstalk for Windows is much simpler to use than its progenitors. You select entries from pulldown windows with a mouse or by entering the first letter. Common menu selections and on-line tasks are duplicated with function keys. As with *DynaComm*, you can assign text macros or scripts to function key combinations, with assignments displayed in a template at the bottom of the screen.

While *DynaComm* greets you with a bewildering array of top-line menu selections stretching across the screen, *Crosstalk for Windows* presents just six pulldown windows. You normally use four: File, Edit, Actions, and Setup. Surprisingly, four main menus are enough, and even if you ignore the function key shortcuts, you rarely get lost in submenus or dialog boxes. The other two menus provide on-line assistance.

The Users menu is an alternative to the function key template. The Help menu, unfortunately, is topic oriented and not context sensitive.

Setting up and managing phone-book entries is far easier than with the other versions of *Crosstalk* and more advanced than with *DynaComm*. However, it could stand to be even easier. Unlike *DynaComm* (and the other *Crosstalk*s), *Crosstalk for Windows* provides a dialing directory, but it's limited to displaying the names and descriptions of entries. You can open an entry and dial from this menu with a few mouse clicks, but to view or modify phone numbers or other parameters, you must go elsewhere.

The File menu lets you easily create or open a phone-book entry and modify simple parameters such as bps rate. To change more complicated settings, you turn to the Setup menu, where parameters are logically ordered in submenus. Each contains a host of well-designed dialog boxes. When no entry is open, you can use these controls to modify global settings for future entries.

In range of parameters, *Crosstalk for Windows* almost matches *Mk.4*. It offers extensive flow control and modem options, plus extras such as color and font settings and function key macros. Its list of error-correcting protocols matches *Mk.4*'s, except for its lack of ZMODEM; you can call on XMODEM and YMODEM, Kermit, Crosstalk, DART, and CompuServe-B. Terminal emulation options are more modest: Only 5 are offered, compared with *Mk.4*'s 25. The VT 102, VT 52, IBM PC (ANSI), IBM 3101, and VIDTEX emulations are plenty for most users, but *DynaComm* offers a few more.

On line, *Crosstalk for Windows* behaves admirably. Unlike *Mk.4*, it presents a constant and informative status line, and the interface is the same as the off-line display. Unlike *DynaComm*, it accompanies error-correcting file transfers with a detailed status display.

When exchanging ASCII text, you can choose from four text-capture options, ranging from normal ASCII to a graphics screen snapshot, and you can add headers and footers to printed documents. When uploading files, you receive directory support, and you can quickly cut and paste text with the Clipboard or with *Windows*' Notepad editor. The program lacks its own editor, but you can call the Notepad by mouse or function key, and you can view a session by playing back the package's capture buffer.

Sophisticated Scripts

To automate communications, you can easily attach scripts to phone-book entries. Thanks to a long list of preset log-in scripts that includes AT&T Mail, MCI Mail, CompuServe, and Delphi, most users won't have to learn the *Crosstalk for Windows* script language. A Learn script for recording log-ins is also available, but a bug kept this from working in the beta version.

The script language lacks some of CASL's extras such as sophisticated windowing and mathematical commands, but it's much more advanced than *Crosstalk XVI*'s language. It provides a built-in compiler and enough windowing extras to let you design your own dialog boxes. Most CASL scripts should work with a little help from the handy automatic debugger, and a translation script is provided for *Crosstalk XVI* scripts.

The script language also sports a few *Windows*-oriented additions. Like *DynaComm*, it supports *Windows*' Dynamic Data Exchange (DDE) protocol for swapping data between *Windows* applications. As a back end for DDE, the script language could automate communications from within any *Windows* program. A sample script updates an *Excel* spreadsheet with data downloaded from a background Dow Jones session.

Crosstalk for Windows doesn't roar into the *Windows* world ready to dominate overnight, but it's easier to use and somewhat more sophisticated than *DynaComm*. Other *Windows* communications packages such as Software Ventures's *Microphone* are on the way. In the meantime, *Crosstalk for Windows* delivers solid *Windows* communications. ●

Eric Brown is an associate editor for PC World.

SNAPSHOT

Crosstalk for Windows 1.0

More feature-rich than *Crosstalk XVI*, this *Windows* communications program makes going on line as easy as pointing and clicking.

KEY FEATURES

- **Full mouse support**
- **Dialing directory**
- **Numerous predefined log-in scripts**
- **Support for interprocess communications via DDE protocol**
- **Sophisticated script language**

AVAILABILITY

Immediate

PRICING

Unavailable at press time

DCA/Crosstalk Communications
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Reader service no. 690

Now Peter Norton

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All you need is a corrupted disk with some valuable data stored aboard.

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The Norton Disk Doctor is one of 27 data recovery and disk management tools in the latest Advanced Edition of the Norton Utilities.®

It's also the most significant advance in utility software technology since Peter Norton first began saving the data and the derrières of grateful PC

```
C>     FILE NOT FOUND!
```

Our legendary UnErase—and its short-cutting offspring Quick UnErase have saved the derrières of thousands of grateful PC users. And they're still saving them.

users around the world with the legendary—and still unequalled—*UnErase.*®

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All by itself.

The Disk Doctor can diagnose and repair everything from bad partition tables and boot records to mangled root directories. It can even reformat bad sectors and write back the old data.

Automatically.

In fact, if the Doctor can't cure your corrupted floppy or hard disk, then Buster, you've got one corrupt disk.

In which case, you'll need to refer to *The Norton Troubleshooter,* a 158-page guide to finding and fixing most anything that could go wrong.

Don't worry, you don't have to go to the bookstore or the library to refer to it, because the Troubleshooter is included in the Advanced Edition.

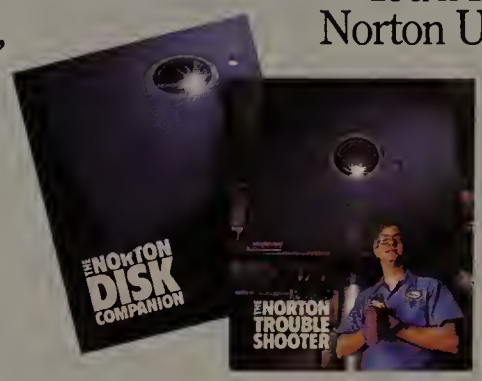
Frankly, the Norton Disk Doctor and the Norton Troubleshooter are worth the price of the new Advanced Edition all by themselves.

But, of course, they aren't by themselves.

They're accompanied by a wish list of features, functions and enhancements sufficient to satisfy the yearnings of all those people who've been politely writing and calling to request them.

The people's choices.

Like *Speed Disk,* the world's most powerful disk tuning tool, which features four user-selectable optimization methods and doesn't lose your data if you lose power.



The Norton Disk Companion is included, free, with both the Standard and Advanced Editions. The Norton Troubleshooter is yours with the Advanced Edition.

And *Format Recover,* which can unformat your accidentally reformatted hard disk even if you haven't taken any precautions beforehand.

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If you haven't got a favorite software dealer, take two aspirin, call us right away at 1-800-365-1010 and place an order.

The Doctor will be on its way in no time.

Peter Norton
COMPUTING

All Utilities now support large hard disks under DOS 4.0, COMPAQ DOS 3.31, and the PC-MOS/386 multi-tasking operating system. Designed for the IBM® PS/2® and PC families and 100% compatibles. © 1988 Peter Norton Computing, Inc. 100 Wilshire Blvd., 9th Floor, Santa Monica, CA 90401-1104

Circle 92 on reader service card

PRODUCT OUTLOOK

INSIDE PRODUCT OUTLOOK

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The best OS/2 LAN just got better; *3+Open* adds more workstation RAM, unlimited E-mail, and single server capabilities for full OS/2 functionality.

80 **Wangtek Data DAT**
Pack more than a gigabyte of data onto this digital audio tape, and retrieve the information quickly. The low cost per megabyte makes it ideal for CAD graphics or backing up a network file server.

82 **dClip**
Step up the pace of *dBASE* applications with a *Clipper* interpreter that does dynamic linking.

82 **Desktop Set**
Office accessories for *Windows*, including a calculator, a phone book, and a calendar.

84 **MyWay**
Keep tabs on the status of your stock with *MyWay*'s "averaging down" savvy.

UPDATE

84 **Streets on Disk 3.0**
Klynas Engineering's expanded navigator-in-a-box not only plots travel directions and calculates time, mileage, and fuel, it now reads mailing lists and marks the relevant addresses on maps.

86 **WordStar 5.5**
Aiming to recapture its crown, *5.5* adds expanded menus, style sheets, and graphics import.

86 **PC Paintbrush IV**
Deft new editing tools, a slick interface, and support for 256 colors fill out an old favorite.

88 **PC-Type II, PC-Calc+**
ButtonWare's word processor gains a comprehensive spelling checker and two-way screen splitting; the spreadsheet adds statistical and financial functions.

With a 2-inch floppy drive, Zenith's MinisPort is a light, full-featured laptop.

MinisPort

Zenith Rolls Out Biggest Little Weapon in the Lap War

Forget the battle for the desktop. The most intense action these days is in the portables market, where competition is raging over the space in your briefcase. NEC fired the first shot with its ultrathin, ultrafunctional UltraLite. Zenith has come back with very, very light artillery—a tiny new addition to its popular "sPort" series called the MinisPort.

A notebook-size laptop with an 8-MHz 80C88 CPU and a backlit 80-by-25-character LCD, the MinisPort caters to the same smaller-is-better crowd as the UltraLite. But there's one big difference: the MinisPort's *2-inch* floppy drive.

Like the UltraLite, the MinisPort comes with 1MB of RAM, expandable to 2MB. Both machines use memory over 640K for a battery-backed RAM disk, and boot by default from DOS 3.3 in ROM. But while the UltraLite features custom-made ROM cards containing popular applications, the MinisPort's removable medium of choice is the 2-inch, 720K "flopette." Zenith says the 2-inch drive is strictly a backup device for the RAM disk, so don't expect software on flopette anytime soon. Programs and data find their way to the RAM disk via optional 3½-inch or 5¼-inch external drives; an external 2-inch drive for your desktop PC is due this fall. Alternatively, you can use the MinisPort's ROM-based, modified version of *LapLink*, Traveling Software's serial communications program that copies itself to the host system.

The 6-pound, $1999 MinisPort is a full $1000 cheaper than the UltraLite and about a pound heavier. The prototype seemed good and solid—particularly the keyboard. The touch of the full-size keys seemed better than most laptops', and the 80-key configuration uses a special "function" key to effectively emulate a 101-key layout.

Zenith conservatively estimates a 3-hour battery life for the MinisPort—with full backlighting, moderate disk access, and perhaps a session or two with the optional 1200-bps internal modem. A pop-up utility lets you set the backlight time-out, configure the built-in serial and parallel ports, and switch from CGA-resolution LCD to an external CGA-compatible monitor.

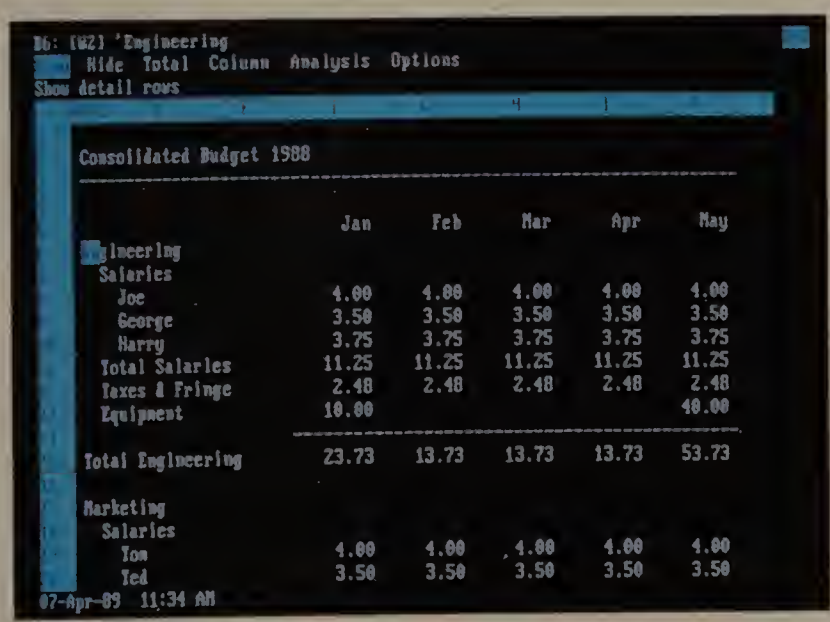
This classy, thoughtfully designed machine makes a convincing claim on your workspace—be it desk, briefcase, or lap. Zenith Data Systems, 1000 Milwaukee Ave., Glenview, IL 60025; 800/842-9000.

—*Eric Knorr*

Reader service no. 631

Budget Express

1-2-3 Add-In Tackles Budgeting



Budget Express brings outlining to your 1-2-3 worksheets, letting you hide and unhide selected rows and/or columns.

Looking ahead is never easy, especially if you're fairly certain that at some time in the future you'll be held accountable for budgeting decisions made today. Symantec's *1-2-3* add-in, *Budget Express*, seeks to reduce the strain on release 2.*x* users by providing convenient tools for budgeting, consolidation, and what-if analysis.

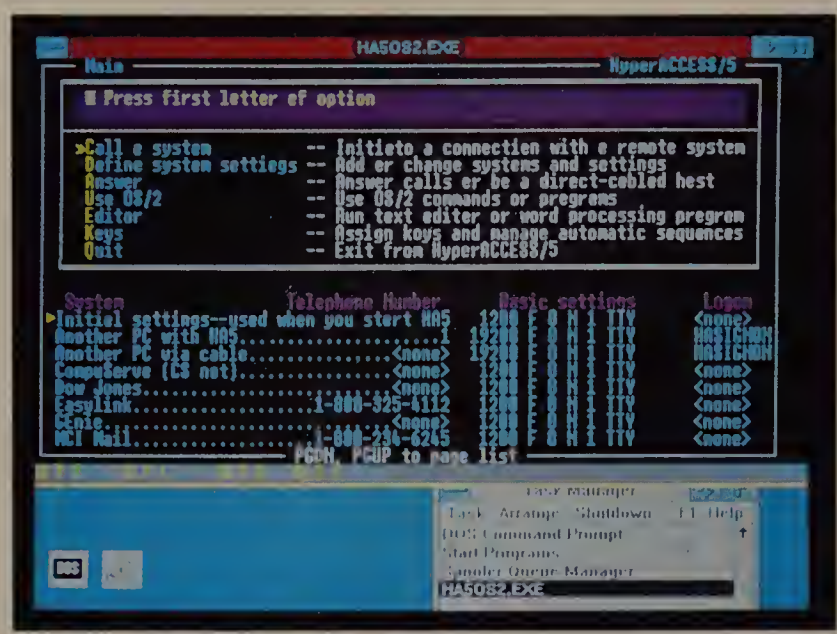
Like many add-ins, *Budget Express* does a little bit of everything, but its main contribution is spreadsheet outlining. Just as you can expand and collapse subheadings in a traditional outliner, *Budget Express* lets you hide and unhide worksheet columns and rows to help you see the forest instead of the trees. For example, you may want to see the Business Meals column under Travel & Entertainment while you are entering data, and then hide it while examining budgetwide summaries and subtotals, either on screen or in print.

Of special interest to managers is the ability to consolidate worksheet files whose rows and columns are laid out differently—a task that *1-2-3* release 2.01's File Combine command can't accomplish. Other capabilities include writing your own ad hoc specifications for consolidations and saving those specifications for later use.

(see Budget Express, p. 76)

HyperAccess/5

Pioneering OS/2 Communicator Runs Multiple Sessions



HyperAccess/5 supports OS/2's ability to run multiple communications sessions with true background operations.

OS/2 is off to a slow start, largely because of the new operating system's complexity. Nowhere is the difficulty more apparent than in developing communications applications, which are particularly sensitive to timing and interrupt issues. Leading manufacturers of communications software have been slow to take up the challenge, but Hilgraeve started two years ago and now offers *HyperAccess/5*, one of the first communications packages to tap OS/2's multitasking capabilities.

HyperAccess/5 supports OS/2's ability to run multiple communications sessions and provides true background operations through processor time slicing. Taking advantage of OS/2's multithreading feature, the package can start other applications as *child processes*. It even lets you determine how much CPU processing power to devote to different background sessions through an easy menu setting. The protected-mode program is character based; a full-fledged Presentation Manager version is due out this fall.

For those not yet ready to make the transition to OS/2, the company ships a DOS version that can be run in character mode or under *Windows* or *Desqview*. The DOS version provides all OS/2 features except multitasking.

Either way, you get point-and-shoot menus and a much broader array of options than with Hilgraeve's other communications product, *HyperAccess 3.2*. You also can run *HyperAccess/5* with commands, even remapping the entire keyboard if you like.

HyperAccess/5 automates communications sessions three ways—macros, command learning, and scripts. Macros simply record keystrokes and characters. Command learning enables you to record frequently used command sequences and automatically generates scripts to run them, complete with pauses for user input and access to other menus; an editor for learned scripts is included. For complex communications, *HyperAccess/5*'s 150-command script language supports Boolean operations, math commands, conditional branching, and subroutines. The program automatically compiles scripts to speed execution.

HyperAccess/5 emulates a wide variety of terminals and offers ten file transfer protocols including the proprietary HyperProtocol. If you communicate with another *HyperAccess/5* user, the program automatically compresses files to accelerate transfers and then decompresses them at the destination. *HyperAccess/5* supports up to 250 passwords for remote users, so you can dole out individual access privileges such as directory access, read-only status, and overwrite capability. Remote *HyperAccess/5* users can also control the operation of the host machine.

HyperAccess/5, which lists for $199, requires 350K and either OS/2 1.0 or a later version or DOS 2.0 or a later version. Users of the $149 *HyperAccess* version 3.3 can get a copy of *HyperAccess/5* for $50. Hilgraeve, Genesis Centre, 111 Conant Ave., Ste. A, Monroe, MI 48161; 800/826-2760, 313/243-0576. —*Wes Nihei*

Reader service no. 634

Budget Express

(continued from p. 75)

Additionally, you can enjoy easy what-if analysis with the program's goal-tracking feature. Simply select a calculated cell—Total Revenue, for example—then choose a target value. At this point you can make changes in any of the cells that affect Total Revenue; the program keeps score and lets you know when you reach the desired value. The original values can also be restored.

A number of keystroke savers simplify budget creation. *Budget Express* automatically inserts month names across the top of your worksheet and generates totals without requiring you to write out @SUM formulas. Menu options make it easy to analyze the percentage of change between data columns or rows and to determine running totals.

Finally, *Budget Express* offers a little virtual memory management hocus-pocus that eases the memory crunch on a big worksheet by optionally "hiding" parts of the file to disk. This budgeting jack-of-all-trades costs $149 and requires *1-2-3* release 2.*x* and 64K of RAM. Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014; 408/253-9600. —*Anita Amirrezvani*

Reader service no. 632

Ted Standish has a bear of a job.

As Director of Information Resources for the North Atlantic Shaving Group of The Gillette Company, he has the task of simplifying and standardizing the business systems of the Company's European and North American divisions.

"This means dealing with hundreds of issues, projects, facts and people throughout the entire North Atlantic region every single day," says Ted.

Which is why he bought Lotus® Agenda®, the personal information manager.

In Agenda, Ted has a tool that's helping him manage ideas, people, projects, facts, tasks, plans and information with incredible ease and efficiency.

Because Agenda allows him to enter

Ted Standish, Director of Information Resources, North Atlantic Shaving Group of The Gillette Company.

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information into his PC without having to structure it in advance. Agenda automatically arranges the data any way Ted wants so he can understand it better and extract the answers he needs better.

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Not to mention remembering things better.

Lotus Agenda

*The $10 demo kit charge is refundable when you purchase Agenda. Agenda is also available in an OS/2® version. If for any reason you're unsatisfied with Agenda, return it with your sales slip within 30 days of purchase and we'll refund your full purchase price. © 1989 Lotus Development Corporation. Lotus and Agenda are registered trademarks of Lotus Development Corporation. OS/2 is a registered trademark of International Business Machines Incorporated.

Mitsubishi MP386S and Dell System 316

SX Desktops—386 Power On Time, Under Budget

The broad-beamed box of the Dell System 316 offers maximum expandability, while Mitsubishi's MP386S saves desktop space—and both offer the power and economy of the 386SX chip.

Can't decide whether to opt for an 80286- or 80386-based computer? If so, 80386SX-based machines from Dell Computer and Mitsubishi Electronics promise you the brawn of a 32-bit processor at prices that compete with 286s'.

Both machines incorporate Intel's 80386SX chip, which offers 16-MHz clock speed and the ability to drive 32-bit software. Neither has the kind of upscale price you may associate with 386 hardware.

If immediate expandability is your concern, the broad-beamed box of the Dell System 316 beckons. Bays on the front accommodate five half-height storage devices. Inside, you'll find six 8/16-bit slots as well as two 8-bit slots. One of the 8/16-bit slots is taken by a video adapter, but a disk controller, serial and parallel ports, and the keyboard interface are all packed on the system board.

For those more interested in desktop space than expansion, Mitsubishi's MP386S makes better sense. The 15-by-15-inch cabinet holds six 8/16-bit slots; the floppy controller, the parallel port, and a pair of serials all sit on the motherboard. Hard disk and video cards will, however, eat into your available slots. The slim cabinet can house a modest three half-height storage drives.

The basic MP386S comes with a respectable 2MB of RAM, to which you can add 2MB on the main system board, another 4MB on a daughterboard, and 8MB using a 16-bit slot—a total RAM capacity of 16MB. Standard features include a 101-key keyboard, 80387SX coprocessor support, DOS 3.3, and GW BASIC 3.2. Entry-level Models 610 and 615, with a single 1.2MB, 5¼-inch or 1.44MB, 3½-inch drive respectively, are priced at $2995. Models 640 and 645 have a 40MB 27ms 5¼-inch hard drive, raising the price to $3995.

By comparison, Dell's basic System 316, with a single 5¼-inch or 3½-inch floppy, a 29ms 40MB hard drive, 1MB of RAM and a monochrome graphics display, runs $2999. You can get another 1MB of memory for a reasonable $200. Like the MP386S, the System 316's memory tops out at 8MB on the motherboard, and 8MB more can be added in an expansion slot. Dell doesn't bundle any software, but the plush warranty includes a 30-day money-back guarantee, next-day deskside service, and one year parts and labor. Dell Computer Corp., 9505 Arboretum Blvd., Austin, TX 78759; 800/426-5150. Mitsubishi Electronics America Inc., Information Systems Division, 991 Knox St., Torrance, CA 90502; 800/556-1234, ext. 25.

—Mark Henricks

Reader service no. 635

PS/2 Model 55 SX

Big Blue's SX Machine Delivers the Micro Channel

There's no big mystery about why Intel's 80386 chip is rapidly becoming the PC engine of choice. In addition to raw processing power, machines packing this 32-bit processor gain a roster of speedy applications like *Paradox/386*, handy multitasking environments like *Desqview*, and full-blown 32-bit operating systems like OS/2 (well, next year anyway) and UNIX.

PCs built around Intel's 80386SX chip are a common entry point for *(see Model 55 SX, p. 80)*

IBM's long-awaited 55 SX brings the benefits of 32-bit software to the PS/2 line at an entry-level price, running up to 42 percent faster than the 10-MHz 80286-based Model 50Z.

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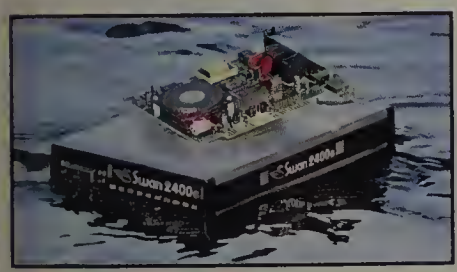

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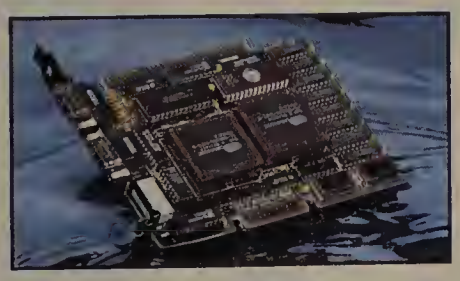

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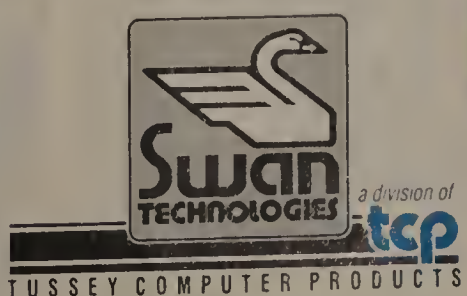

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Drive Options	Mono†	CGA	EGA	VGA
Single Floppy	$699	$869	$1098	$1198
Dual Floppies	$779	$949	$1178	$1278
*w/32MB (40ms) Hard Drive	$979	$1149	$1378	$1478

* Includes Single 360K Floppy Drive
† Upgrade from 12" to 14" Flat Screen, add $49

$999

Base System with Single Floppy, No Video

286/12	VIDEO OPTIONS Include Monitor & Video Adapter			
Drive Options	Mono	14" Flat Mono	EGA	VGA
w/32MB (40ms) & 1:1 Interleave	$1399	$1448	$1798	$1898
w/48MB (28ms) & 1:1 Interleave	$1499	$1548	$1898	$1998
w/80MB (28ms) & 1:1 Interleave	$1849	$1898	$2248	$2348

Standard Features	XT10	286/12	386SX	386/20D
CPU	8088-1	80286	80386SX	80386
Speed (MHz)	10/4.77	12/6	16/8	20/8
BIOS	Phoenix	Phoenix	Phoenix	Phoenix
Norton SI Rating v 4.0	2.1	11.2	17.6	22.0
Standard Memory	640K	512K	1MB	1MB
Shadow BIOS	—	—	Yes	384K
Memory Upgrades	—	1MB	2/3/5/6/8MB	2/4/8/10/16MB
Coprocessor Support	8087	80287	80387SX	80287 or 80387
Expansion Slots: 32-bit	—	—	—	1
Expansion Slots: 16-bit	—	6	6	4
Expansion Slots: 8-bit	8	2	2	3
Dual HD/FD Controller	w/HD systems	Yes	Yes	Yes
Device Bays (Exposed/Internal)	2 Exp./2 Int.	3 Exp./2 Int.	3 Exp./1 Int.	3 Exp./2 Int.
Serial Ports	1	1	1	2
Additional I/O Ports	1 Par/1 Game	1 Parallel	1 Parallel	1 Parallel
Power Supply	150W	200W	200W	200W
Keyboard (Touch & Click or Silent)	101 Key	101 Key	101 Key	101 Key
Additional Features	Clock Calendar w/Battery Backup and Setup/Utilities Disk			
3.5" Floppy Drive	Optional	Your choice	Your choice	Your choice
MS-DOS & GW BASIC add $89				

$1499

Base System with Single Floppy, No Video

386SX	VIDEO OPTIONS Include Monitor & Video Adapter			
Drive Options	Mono	14" Flat Mono	VGA Mono	VGA Color
w/32MB (40ms) & 1:1 Interleave	$1899	$1948	$2098	$2398
w/48MB (28ms) & 1:1 Interleave	$1999	$2048	$2198	$2498
w/80MB (28ms) & 1:1 Interleave	$2349	$2398	$2548	$2848
w/187MB (18ms) ESDI w/1:1 Interleave	$2994	$3043	$3193	$3493

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Base System with Single Floppy, No Video

386/20D	VIDEO OPTIONS Include Monitor & Video Adapter			
Drive Options	Mono	14" Flat Mono	VGA Mono	VGA Color
w/48MB (28ms) & 1:1 Interleave	$2499	$2548	$2698	$2998
w/80MB (28ms) & 1:1 Interleave	$2849	$2898	$3048	$3348
w/150MB (18ms) ESDI w/1:1 Interleave	$3494	$3543	$3693	$3993

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3 + Open

3Com Fills Out Its OS/2 Net

With five new services for *3 + Open*, 3Com becomes the first vendor to deliver a fully functional OS/2 network operating system that runs on a single OS/2 server.

3 + Open remains the best OS/2 network operating system—fast and flexible, with outstanding security, an excellent user interface, and administrative tools that set a new standard for versatility and ease of use.

But it left each DOS workstation only 448K of usable RAM, and like all OS/2 network operating systems, required two dedicated servers—an OS/2 server for the network OS and a DOS server for essential features otherwise unavailable in OS/2.

Now five new pieces change the puzzle completely. *3 + Open Mail* ($1190) provides full E-mail capability for unlimited network users. *3 + Open Start* ($295) lets you boot any number of diskless workstations directly from the OS/2 server. And *InterNet* ($1500), the OS/2 equivalent of *3 + Route*, provides a global name service to simplify accessing network resources in a multiple-server environment.

In addition, *3 + Open* includes NBP Service, which lets workstations access 525K of usable RAM; this makes it possible to run many applications that were previously too large to load. Also, an OS/2 version of Backup is now shipping, at no extra cost, with both of 3Com's dedicated network servers, the 3S/401 and the 3S/402.

Five new services make 3 + Open the first fully functional OS/2 network operating system to run on one OS/2 server.

3 + Open was the first implementation of Microsoft's *LAN Manager* out of the gate, so it's not surprising that the program is now the first to achieve full OS/2 functionality. *3 + Open* requires *LAN Manager 1.0* running with OS/2 Standard Edition 1.0, and 4MB of RAM and 8MB of hard disk space on the server. DOS 3.1 workstations need 640K, and OS/2 workstations 2.5MB with a 10MB hard disk. 3Com Corp., 3165 Kifer Rd., Santa Clara, CA 95052; 800/638-3266, 408/562-6400. —*Michael Goodwin*

Reader service no. 636

Model 55 SX

(continued from p. 78)

386 computing, bringing the benefits of 32-bit software at a lower price. IBM, one of the last major vendors to join the parade, now offers the PS/2 Model 55 SX—the first SX machine to sport the computer giant's much-discussed Micro Channel Architecture.

The 55 SX comes in the low-slung Model 30 form factor—16 inches square and 4 inches high. The base system features 2MB of RAM (expandable to 4MB on the system board and 16MB total), a 1.44MB 3½-inch floppy drive, serial and parallel ports, a mouse port, a VGA port, and three 16-bit expansion slots. IBM offers two models, one with a 39ms 30MB drive for $3895 and the other with a 27ms 60MB drive for $4295.

Depending on the application, Big Blue says, the 16-MHz 55 SX performs up to 42 percent faster than the 10-MHz 80286-based Model 50Z (which lists for $645 less than the Model 55 with equivalent hard disks) and 15 to 25 percent slower than the 386-based IBM PS/2 Model 70 running at the same clock speed. If you need a little more oomph for number crunching, an optional 80387SX math coprocessor costs $795. IBM, 900 King St., Rye Brook, NY 10573; 800/447-4700. —*Eric Bender*

Reader service no. 633

Wangtek Data DAT

Back Up Gigabytes of Data With DAT

Digital Audio Tape technology delivers homemade digital recordings of such clarity that it scares the purveyors of prerecorded music. In data storage, DAT hasn't created quite such a furor, but this high-capacity backup technology at a low per-megabyte price will be music to your ears.

The Data DAT covers more tape in less time than conventional scanning methods, so you can locate a file on a 1.3GB cassette in only 40 seconds. Then file transfer proceeds.

Data DAT's gigabyte-plus capacity makes it a natural complement to conventional, ¼-inch streaming tape backups for data-intensive applications such as network file servers, medical imaging, telemetry, and CAD graphics. You can record audio and video as well as data files.

At a suggested retail price of $1800, Data DAT offers a price per megabyte that's a fraction of traditional magnetic disk and optical disk drives'. It requires a full-height, 5¼-inch drive bay and a SCSI interface. Wangtek, 41 Moreland Rd., Simi Valley, CA 93065; 805/583-5255. —*Mark Henricks*

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AND COMING THIS FALL: Microsoft® DOS; WordPerfect® Library

Circle 25 on reader service card

dClip

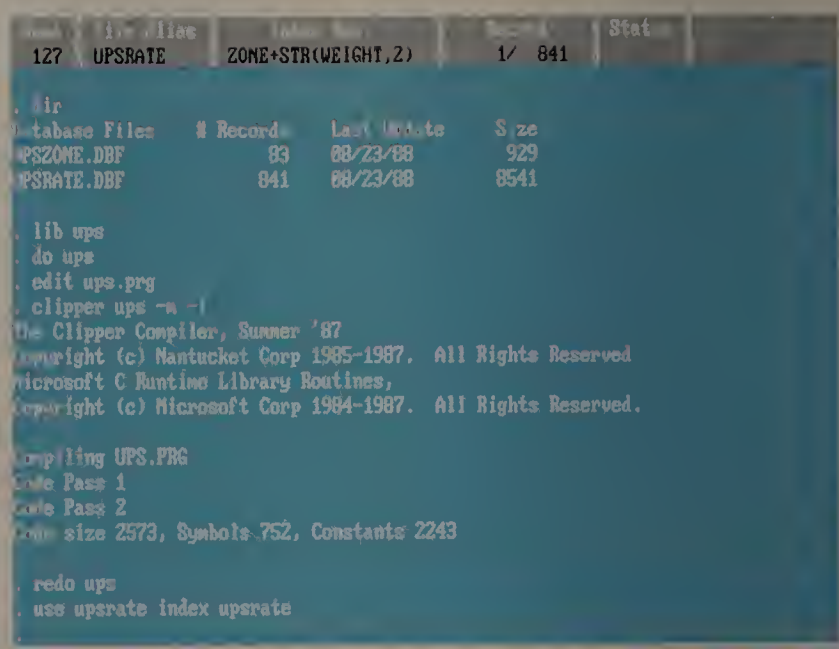
Full Speed Clipper Compiling

As its name implies, the *Clipper* compiler puts zip into *dBASE* applications. But as any dBASE programmer knows, the price of faster-executing code is a relatively lengthy object-file linking process.

dClip is a fully powered *Clipper* interpreter that features dynamic linking at run time and offers a familiar *dBASE* dot prompt interface for first-timers. *dClip*, which is written in *Clipper Autumn '87*, includes a complete superset of the dBASE language. The program supports the entire set of *dBASE III* and *Clipper* commands and functions plus 80 new ones.

Clipper hotshots will appreciate *dClip*'s dynamic linking feature, which bypasses the time-consuming linking process during application building and program module modification. After *dClip* compiles object files, it simply links them to the appropriate modules at run time. Additionally, the program automatically loads and unloads object files as needed by an application, eliminating the need to tinker with overlays to speed up program execution.

dBASE and *Foxbase* graduates will welcome *dClip*'s familiar dot prompt, from which you can edit, compile, and execute *dBASE* source code, as well as use any *Clipper* function or user-defined function simply by typing the syntax. The program's menu-driven data base manager generates reports and labels created with its built-in text editor.



dClip compiles and automatically loads and unloads object files, eliminating the need to tinker with overlays.

dClip, which retails for $199.95, requires *Clipper '87*, DOS 2.0 or a later version, and 640K. A hard disk is strongly recommended. Donnay Software Designs, 4000 Park Newport #401, Newport Beach, CA 92660; 714/721-6720. —*Wes Nihei*

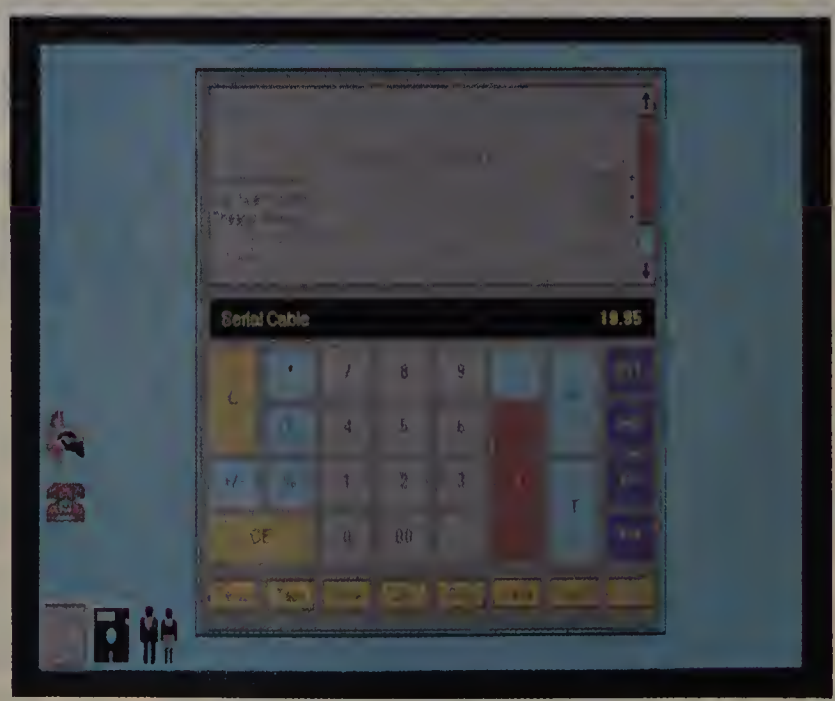
Reader service no. 639

Desktop Set

Side Windows

Okna Corporation hopes to do for Microsoft's *Windows* what Borland's *SideKick* does for OS/2 Presentation Manager. Okna's *Desktop Set* consists of some of the most common helpmates for the multitasking environment, including a calculator, phone book, auto-dialer, and calendar, all tightly integrated to minimize keystrokes or mouse clicks.

Windows has its own calculator, but the one in *Desktop Set* produces editable tapes that can be saved and recalled. Although its entries can be annotated, the calculator's data entry is a little less flexible than Borland's.



Desktop Set assembles some of the most common helpmates for Windows, including an editable tape calculator and an auto dialer.

The electronic phone book resembles the one in your briefcase—click on a letter tab, and it opens on an unlimited number of disk-based pages. Similarly, you can attach unlimited note files to any address field.

Naturally, the phone book is closely linked to the *Desktop Set* dialer, which stores up to 105 numbers for one-touch dialing and which can be activated by clicking on the appropriate button in the phone book. The dialer can be set up for least-cost routing, includes an area code directory, and automatically logs incoming and outgoing calls.

Linked to the phone book and the dialer, the calendar lets you set alarms and dial by clicking on an appointment name. It has year, month, and diary modes and an expense ledger.

Desktop Set requires DOS 3.0 or a later version, 512K of memory, and *Windows*. Okna Corp., 285 Van Buren St., Lyndhurst, NJ 07071; 201/460-0677. —*Mike Hogan*

Reader service no. 640

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MyWay

In Stocks, Timing Is Everything

MoneyWon would like to add a third tooth to the old saw about there being nothing certain but death and taxes—namely that stock prices will go up and they will come down. By the company's reckoning, 75 percent of all stocks' prices fluctuate more than 50 percent a year. This constant movement provides users of its new program, *MyWay*, with profit opportunities.

Offering neither technical nor fundamental analysis, *MyWay* won't tell you which stocks to buy. But it will tell you when to buy and sell them and in what quantities. The crux of *MyWay* is a common stock-buying technique called *averaging down*, in which you reduce the overall cost of your portfolio and your risk by buying small quantities of an otherwise attractive stock during the inevitable periods when its price falls. You sell appropriate amounts with the equally inevitable price rises.

MyWay keys off these stock-price fluctuations, constantly reassessing your position within the context of your investment objective of capital security or rapid growth. *MyWay* can be particularly helpful if you practice fundamental analysis, which tends to focus closely on the parameters of an individual stock but may miss the impact of broad market movements. MoneyWon recommends that you stick to only "well-established companies that have been on the market for some time"—read those selling $100 million and up.

MyWay lacks a word processor, data base manager, and other add-ons available with more elaborate stock-trading packages. Neither is it a personal financial management program that will help manage your budget, checkbook, or bank accounts. But it numbers each trade and maintains a history file for tax purposes. It also keeps track of the total number of shares on hand, their current value, and shares traded to date with average buy and sell prices.

MyWay employs the time-honored stock-buying/selling technique of "averaging down" to find profit opportunities whichever way the market is moving.

The $495 product requires DOS 2.0 or a later version and 512K of RAM. MoneyWon, Inc., 603 First Ave., Raritan, NJ 08869; 800/535-4002, 201/707-8100. —*Mike Hogan*

Reader service no. 641

UPDATE

Streets on Disk 3.0

Getting Around

Streets on Disk 3.0 shows you new ways to get from point A to point B; it now supports maps with up to 500,000 streets of 16 different types as well as other lines representing waterways and railroad tracks.

Version 3.0 also tells you a few things about points A and B that will help your business as well as your auto move along. The new Autoplace feature automatically reads a mailing list and positions tokens at the appropriate addresses; each token can hold 100 lines of description. You can display and edit up to three map files at once, adding custom information such as sales territories and pipeline locations.

And when it's time to go out and make those sales calls, *Streets on Disk* generates travel directions and calculates mileage, travel time, and fuel requirements. You can plot a route that takes into consideration such variables as one-way streets, varying travel costs, and speed settings for seven types of streets. Each route is generated atop a street map with full graphics and a detailed travel report.

Streets on Disk's $150 base package comes with a 100-page manual, a U.S. road map, a detailed sample map file, and utilities for special applications. Additional map data bases for hundreds of cities are available for between $20 and $640, depending on the size and detail of the map. An upgrade from previous versions costs $35.

The program requires DOS 2.0 or a later version and 512K of RAM. Klynas Engineering, P.O. Box 499, Simi Valley, CA 93062-0499; 805/583-1029.

Reader service no. 646

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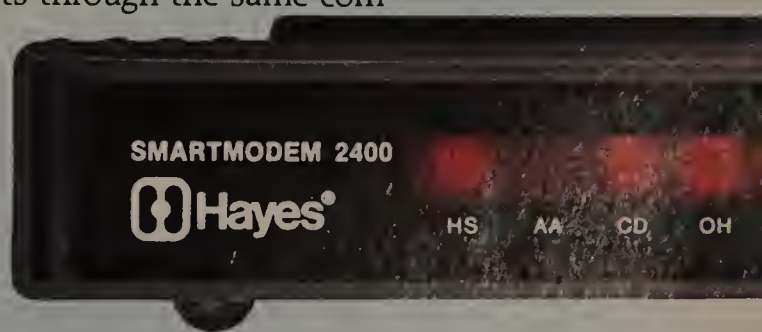
Our best advice is that you ignore them all and get a Hayes modem with AutoSync instead. That way your PC can automatically talk synchronously* to mainframes or asynchronously to other PCs and hosts through the same communications port on your computer.



You see, AutoSync is built into Hayes 2400 bps, and higher-speed, stand-alone or board modems and all Hayes V-series™ modems. So you won't have to rely on synchronous adapter cards, protocol converters and other impressive sounding equipment that can cost so much money. AutoSync is even a standard feature in the Hayes modem available in the Zenith® TurbosPort™ laptop, so you can communicate with the office mainframe from almost anywhere.

We think you'll agree that getting a Hayes modem with AutoSync is a lot better than wasting money on needless equipment. Or needless advertising.

Hayes.

For your nearest Hayes Advanced Systems Dealer, call 800-635-1225. Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, GA 30348.

*Using software which incorporates the Hayes Synchronous Driver (HSD) purchased from CQ Computer Communications, Digital Communications Associates, or Network Software Associates.

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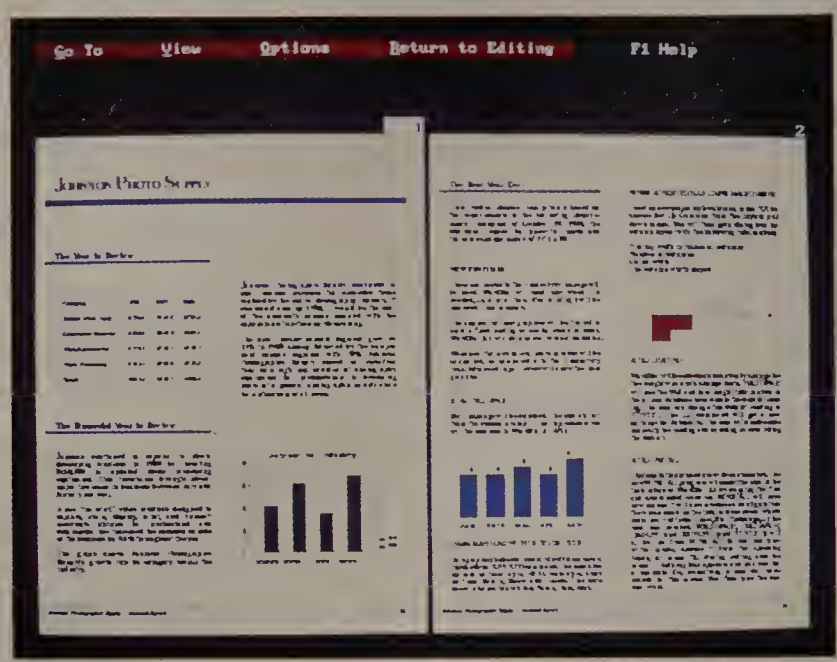
Circle 343 on reader service card

WordStar 5.5

An Old Star Gets New Shine



WordStar 5.5 offers expanded menus, the ability to import a full page of graphics, style sheets, and a print preview mode.

WordStar was the first heavy-hitting word processor, a product that helped make the PC an everyday office tool. Subsequent newcomers like *Microsoft Word* and *WordPerfect* surpassed it in features and popularity years ago, but *WordStar* is rising again. The latest incarnation from WordStar International (formerly MicroPro) offers a broad range of visual embellishments, including expanded menus (à la IBM's Common User Access Interface), graphics import capabilities, and style sheets.

At the heart of *WordStar*'s graphics-handling talents is a link to *Inset*, a screen grabber bundled with the program. Once *Inset* hauls graphics into a document, they can be cropped, expanded, rotated, scaled, and inverted. *WordStar* offers a line-drawing feature that can create variable-width lines, rectangles, and circles. You can further embellish graphics with text, fill patterns, and clip art and edit at the pixel level. The preview mode lets you take a gander at both graphics and text on screen before printing.

If you use *WordStar* to produce a steady stream of documents, you'll appreciate *5.5*'s style sheets, which give you a menu of format attributes so you can save commonly used styles and attach them to specific portions of text. Style sheets let you automatically change fonts, character height, and line spacing; reset margins and tabs; and justify text. Style sheets also set print attributes such as boldface, underlining, and italics.

WordStar 5.5 provides several predefined styles for body text, titles, hanging indents, paragraph indents, and footnotes; those and style sheets of your own creation are kept in a library for quick access.

The package handles an expanded range of document formats and languages thanks to *Star Exchange*, a document conversion utility for *DisplayWrite 4 1.0*, *Microsoft Word 4.0*, *MultiMate Advantage II 3.6*, *WordPerfect 5.0*, and *WordStar 2000 3.0*.

WordStar 5.5 also broadens your output capabilities. For example, your laser printer can incorporate 255 fonts in a document, including Bitstream fonts in sizes up to 72 point. When you use different type styles and sizes, *5.5* automatically calculates character height and leading. Additionally, a typewriter mode lets you print envelopes and quick and dirty documents directly to the printer.

WordStar 5.5, which retails for $495, requires 512K and DOS 2.0 or a later version. The upgrade price is $89 from *WordStar 5.0* and $199 from prior versions. WordStar Int'l, 33 San Pablo Ave., San Rafael, CA 94903; 800/227-5609.
—*Wes Nihei*

Reader service no. 643

PC Paintbrush IV

A Cleaner Paintbrush and a Brighter Palette

A low-priced paint package is an invitation for occasional desktop publishers to experiment with touching up scanned images. But that package seems less of a bargain if you must first invest hours learning new commands.

That's why Z-Soft has hung a new *Windows*-like interface on an old favorite. You'll find *PC Paintbrush IV* quick to learn if you are an experienced user of the Microsoft environment. Even if you aren't, Z-Soft has added an unusual amount (for the graphics world) of context-sensitive help. You'll find on-line assistance at the touch of the <F1> key.

But there's more to *PC Paintbrush IV* than a new interface. You can cut, duplicate, color, overlay, reverse, or invert images with a pouchful of touch-up and gray-scale editing tools. Your color work will be brighter thanks to support for 256 colors. If your image starts out in color and you want it in black and white, *PC Paintbrush IV* automatically handles the conversion to as many levels of gray.

You control a range of new effects, including gradient shading that lets you automatically blend a shade from one side of an image into another shade on the other side, from inside out, or vice versa. You can manipulate fine details, such as a few fea-

(see PC Paintbrush, p. 88)

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Circle 38 on reader service card

PC-Type II, PC-Calc +

Shareware Goes Retail

ButtonWare's PC-Type II beefs up its spelling checker and mail merge, while PC-Calc + adds statistical and financial functions.

ButtonWare has updated its word processor and spreadsheet, *PC-Type II* and *PC-Calc +* respectively. New features in the $89.95 *PC-Type II* include an improved spelling checker with a 100,000-word dictionary, and both horizontal and vertical screen splitting. You also can work with ten files open in up to four windows simultaneously.

PC-Type II offers mail merge with more flexible searching than *PC-Type +*, it supports a wider array of file formats, and it includes a wider variety of editable macros. Also added are a pop-up calculator and extensive context-sensitive help.

The $69.95 *PC-Calc +* version 2.0 contains many new statistical and financial functions, including straight line depreciation, Poisson distribution, declining balance, and linear regression.

You can perform such word-processing functions as search and replace on cell labels, as well as convert labels to values and vice versa. The new version has improved minimal recalc, and a completely rewritten graphics module offers new graph types such as stacked bar charts and logarithmic scaling.

Both packages require DOS 2.0 or a later version and 384K of RAM. The ButtonWare product line is now fully integrated; the *PC-File:dB* data base, *PC-Type II*, and *PC-Calc +* can read each other's native file formats.

Registered users of *PC-Type II* and *PC-Calc +* will receive update notices and can upgrade from earlier versions by sending $35 to ButtonWare. ButtonWare Inc., P.O. Box 96058, Bellevue, WA 98009-4469; 800/528-8866, 206/454-0479.

Reader service no. 644

PC Paintbrush

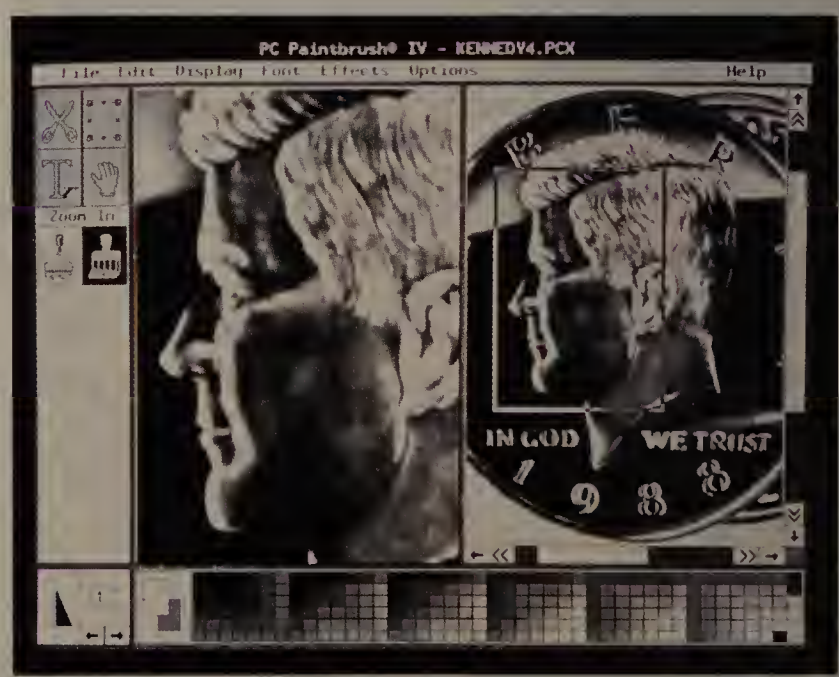
(continued from p. 86)

tures on a scanned-in face, or not-so-fine ones, such as tints for the entire image. A split screen lets you edit at the pixel level on one side and view the resulting big picture in the other. There are more than a dozen new options for enhancing the words that accompany your images, including outline fonts, 3-D shadow effects, and automatic text justification.

While files can now be output in TIF as well as PCX format, the program still doesn't do a perfect job of converting its bit-mapped raster graphics to vector format. Nor can *PC Paintbrush IV* compete with draw programs. However, if you scan many images that need to be touched up after they're in your system, *PC Paintbrush IV* is a clean version of an old standby with new power in many of the right places.

The program requires at least 640K of RAM, a graphics display, and DOS 3.0 or a later version. It lists for $99.95; upgrades from earlier versions cost $35. Z-Soft Corp., 450 Franklin Rd. #100, Marietta, GA 30067; 404/428-0008. —*Mark Henricks*

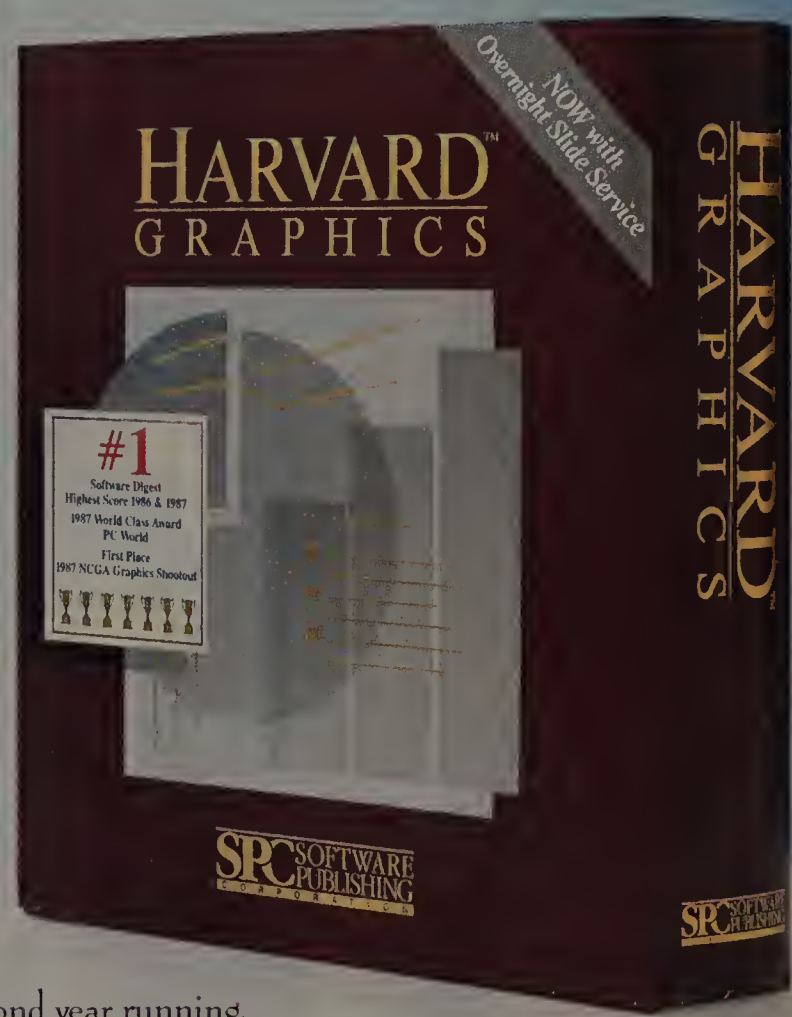
Reader service no. 642



PC Paintbrush IV adds a new Windows-like interface, a pouchful of touch-up and gray-scale editing tools, and support for 256 colors or gray levels. A split screen lets you edit at the pixel level on one side and view the resulting big picture on the other.

For more information about any product, contact the manufacturer or circle the number on the reader service card.

A Few Words From The World's Most Celebrated Graphics Software.



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Actually it must have been all those things and more. Otherwise why would PC Magazine call Harvard Graphics "the de facto standard" software for business graphics?

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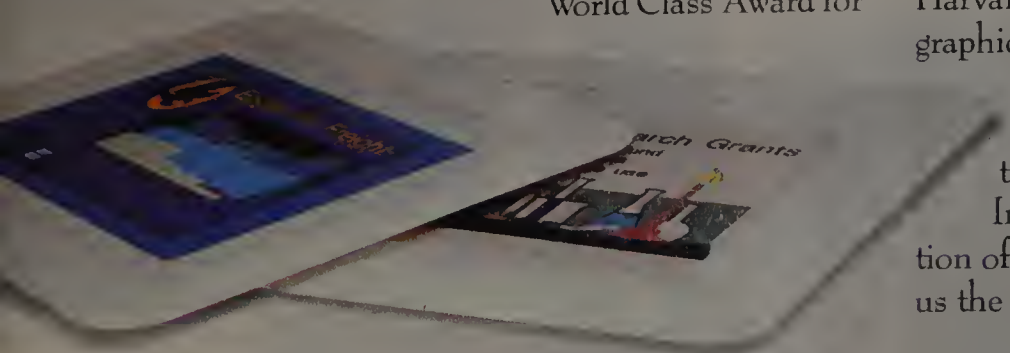

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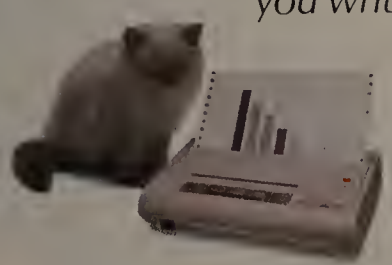

Portable power for the printed page.

The new vision of Kodak

Kodak

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Circle 76 on reader service card

IBM's Lovable Luggable

It's big. And it's not pretty.

But the new PS/2 Model P70 386 transportable is the best value IBM has delivered in ages.

Eric Knorr

PIERRE-YVES GOAVEC

You were expecting maybe another substandard laptop like the PC Convertible? Guess again. IBM's Micro Channel–based PS/2 Model P70 386 is a mobile 20-MHz powerhouse with the highest-resolution flat-screen display available, plus ample accommodations for RAM, mass storage, and expansion boards. But it's the price that makes the P70 the transportable to beat.

The AC-only P70 costs $7695 in its base configuration. That may sound steep, but not for a portable with 4MB of RAM, a 60MB ESDI hard disk, and a monochrome gas plasma VGA display; $600 more adds a 120MB ESDI hard disk. In contrast, the 20-MHz Compaq Portable 386 starts at $7999 with an AT-style 40MB hard disk, an EGA display, and a mere megabyte of RAM. Incredibly, the P70 is also much cheaper than its 20-MHz desktop counterpart, the PS/2 Model 70-121. Load both systems with a 120MB hard disk and 4MB of RAM (and a monochrome VGA monitor for the Model 70-121), and the P70 costs nearly $2000 less.

There's no trade-off in performance, either. In National Software Testing Laboratories' tests, the P70 matched the Model 70-121's scores almost point for point. That puts the P70 near the bottom when compared to most 20-MHz 80386 desktops but slightly ahead of Compaq's speedy Portable 386 (see "Portable Power," *PCW*, May 1989).

Measuring 5 by 18 by 12 inches and weighing nearly 21 pounds, the boom box–shaped P70 is no lightweight. Moreover, it's downright homely compared to such sleek clamshells as the Toshiba 5200. But like the 5200, the P70 boasts a spectacular, high-contrast (150-to-1) display that measures 10 inches diagonally and supports the VGA's 16 shades of gray (orange, actually). Next to the screen resides a 3½-inch 1.44MB floppy drive, which pops up to accept or eject disks.

When you batten down the P70 for travel, the keyboard snaps on to cover the display and floppy drive. The full-size, 101-key unit has a response as sure as any desktop PS/2 keyboard's. It's detachable, and the cord is long enough for kicked-back computing.

The P70's large memory capacity is a key attraction. You can load the system with 16MB of 32-bit RAM, 8MB of which is accessible at CPU speed. Four motherboard sockets hold 1MB or 2MB SIMMs (Single In-Line Memory Modules), and you can mix and match them for numerous memory configurations. Kudos to IBM for selling the machine with two 2MB instead of four 1MB SIMMs so you don't need to discard SIMMs to raise CPU-speed RAM above 4MB.

Should you really want a 16MB system to go, you can plug as much as 8MB into the

EXECUTIVE SUMMARY

IBM PS/2 Model P70 386

20-MHz 80386 transportable

BEST BUY

This time IBM did it right. The PS/2 Model P70 386 is not only fast, it's much cheaper than any mobile computer in its class. The gas plasma display is first-rate, and there's plenty of room for expansion. The trade-offs are in the P70's bulk and boring appearance—but you can't have everything.

	POOR	FAIR	GOOD	EXCELLENT
CPU-speed RAM				●
Expandability				●
Portability		●		
Ergonomics				●
Performance				●
Overall value				●

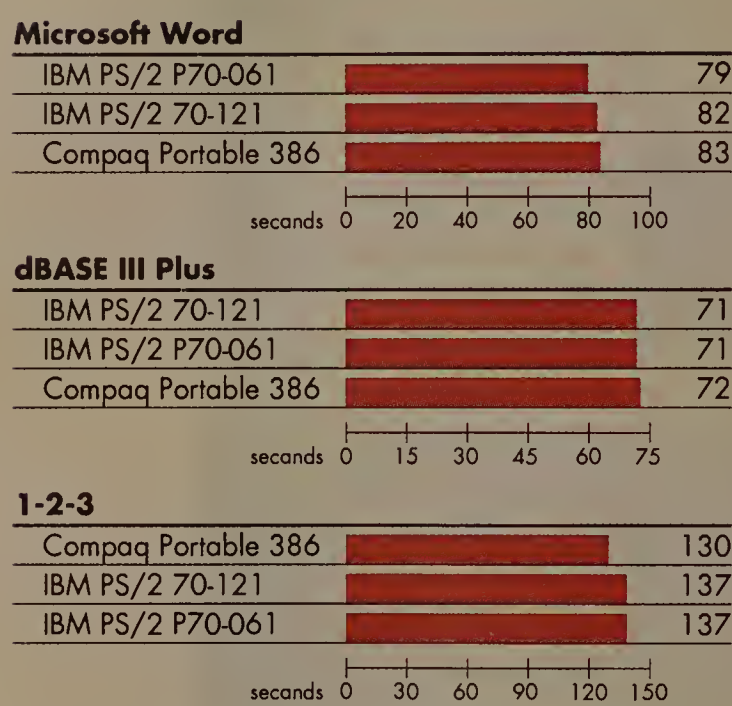
Reader service no. 601

IBM's PS/2 Model P70 (far left) is murder on the shoulder, but speed, low price, and a superb display make it worth the weight.

NSTL TEST REPORT

IBM's P70 Beats Compaq's Fastest Luggable

Traveling computers generally trade speed for mobility, but not the 20-MHz PS/2 Model P70. Not only is it a hair faster than its desktop counterpart, the PS/2 Model 70-121, it edges out Compaq's industry-standard 20-MHz 80386 portable.



[1] Compaq VGA board installed in the Compaq expansion slot in order to run AutoCAD EGA benchmark.

Methodology
All machines were tested with a coprocessor and a 256K extended memory disk cache (except in the *1-2-3* benchmark). The Compaq Portable 386 was configured with a 43MB hard disk and 4MB of RAM. The IBM Model P70-061 was configured with a 60MB hard disk and 8MB of RAM. The IBM PS/2 Model 70-121 was configured with a 120MB hard disk and 3MB of RAM.

Microsoft Word 4.0
A *Microsoft Word* macro loads a 35-page, 140-paragraph document and performs search-and-replace and spell-checking operations. The first page of the document is then printed. Although the results of the benchmark depend primarily on processor and memory access speeds, display adapter and hard disk speeds are also contributing factors.

dBASE III Plus 1.1
The *dBASE III Plus* test measures the time required to prepare and print a report of past-due invoices. The report includes calculated fields and is based on three files: a 500-record customer file, a 1000-record invoice file, and a 2000-record item file. When disk caching is not used, the random access speed of the hard disk is, after processor speed, the most significant factor in this benchmark. With disk caching, sequential read performance becomes more important than random access.

1-2-3 2.01
In this benchmark, a *1-2-3* macro executes a series of recalculations using five different formulas within a 75-by-75-cell matrix. Because there are few screen updates and no disk access is required, the results depend almost entirely on processing and memory access speeds.

Microsoft C 5.0
The *Microsoft C* benchmark measures the time required to compile and link *XLISP*, a public-domain program composed of 25 C source code files. The most important factors in this benchmark are processor and memory access speeds. The performance of the hard disk is also a factor; generally, disk caching has little effect.

AutoCAD 9
In this benchmark, a three-dimensional sample drawing is retrieved and displayed using *AutoCAD*'s EGA driver. The zoom function is used to display the drawing from various perspectives; then the full drawing is printed. The results of the benchmark depend primarily on the speeds at which the processor and coprocessor operate and at which memory is accessed. The performance of the display adapter and the hard disk also have same effect.

Data based on tests designed and conducted by National Software Testing Laboratories (NSTL). All rights reserved.

P70's 32/16-bit slot using IBM's 32-bit Micro Channel memory board. As with all Micro Channel machines, however, the expansion bus runs at 10 MHz; memory there will be accessed at half speed. Of course, you can use the 32/16-bit slot for purposes other than memory—it will accommodate any 32- or 16-bit Micro Channel board. The other slot holds only 16-bit, *half-length* Micro Channel boards, which are rare. You'll probably use it for IBM's optional ($449) 2400-bps internal modem, which is cut to fit.

A door on the back of the P70 hides a recess containing a mouse port, one parallel and one serial port, and a video interface for

an external VGA monitor. A proprietary interface connects to an optional 5¼-inch, 1.2MB floppy drive that goes for $495. In addition, the recess provides access to the rear brackets of expansion boards.

IBM's support materials, predictably, are excellent. The well-illustrated manual walks you through everything you need to know in remarkably few pages, and IBM's bootable Reference Diskette does its usual stellar job of making testing and configuration a breeze.

The P70's 4MB minimum of CPU-speed RAM makes the machine OS/2 capable right out of the box. At this writing, if you opt for OS/2, IBM is sweetening add-on memory deals for all 80286 and 80386 systems. You get a $100 rebate per add-on megabyte (up to 4MB) if you license IBM OS/2 Standard Edition, and $200 off if you license Extended Edition or LAN Server.

No matter how you configure it, the P70 is a deal. It's not the fastest 20-MHz transportable—that honor will likely belong to the (as yet untested) Toshiba 5200, which has memory caching—but it beats a comparably configured 5200 by nearly $3000 and offers the same dazzling display. The P70's sole drawback—its bulk—is off-set by excellent memory, mass storage, and board capacities. Subtract one 32-bit Micro Channel slot, and the P70 doesn't just resemble the Model 70-121 desktop, it *is* the Model 70-121—in a sturdy, mobile package with a Best Buy price. ●

Eric Knorr is a senior editor for PC World.

WHERE TO BUY

PS/2 Model P70 386
IBM
1133 Westchester Ave.
White Plains, NY 10604
800/IBM-2468
LIST PRICE: with 4MB RAM, 60MB ESDI hard disk, 3½-inch 1.44MB floppy drive, mouse port, one parallel and one serial port $7695; with 120MB ESDI hard disk $8295
ACCESSORIES: 1MB 32-bit SIMM $695, 2MB 32-bit SIMM $1395; 8MB 32-bit Micro Channel memory expansion board with 2MB installed $1695, 2MB memory module for memory board $995; 2400-bps Internal Modem/A $449; external 5¼-inch 1.2MB floppy drive $495; 80387 math coprocessor $1295; IBM mouse $95; leather carrying case $350, nylon carrying case $180; IBM PC-DOS 4.01 $150, OS/2 Standard Edition 1.2 $340, OS/2 Extended Edition 1.1 $830

FEATURES EVALUATION

With the P70, IBM Gets Aggressive

Talk about competitive—the PS/2 Model P70 386 is $3000 cheaper than its nearest big-name rivals.

● Yes
○ No

	IBM PS/2 Model P70 386	Compaq Portable 386	Toshiba T5200
Standard features			
Price	$8144 [1]	$11,095 [2]	$11,197 [3]
CPU	80386	80386	80386
Clock speed	20 MHz	20 MHz	20 MHz
Coprocessor support	80387	80387	80387
Disk-caching software included	●	●	●
Standard floppy drive	1.44MB	1.2MB	1.44MB
CPU-speed RAM			
Capacity	8MB	11MB	8MB
Expandability			
8/16-bit expansion slots/ number free [4]	2/1 [5]	0 [6]	1/1
8-bit expansion slots/ number free	0	0	1/1
100MB or larger hard disk available from maker	●	●	●
Portability			
Weight (pounds)	20.8	20	18.7
Volume (cubic inches)	1080	1152	888
Automatic head parking	●	●	●
Ergonomic design			
Display			
Screen type	gas plasma	gas plasma	gas plasma
Graphics standard	VGA	CGA [7]	VGA
Screen tilt (degrees)	30	30	140
Switchless configuration	●	○	○
Complete documentation	●	●	●
Dedicated numeric keypad	●	●	●

[1] With 4MB RAM, 60MB hard disk, 1.44MB floppy drive, 2400-bps modem, mouse port, one parallel port, and one serial port.
[2] With 4MB RAM, 40MB hard disk, 1.2MB floppy drive, 2400-bps modem, one parallel port, and one serial port.
[3] Price based on same configuration as in footnote 2, except with 1.44MB floppy drive.
[4] With modem installed.
[5] The P70 has one 32/16-bit slot (which accepts full-length boards) and one 16-bit slot (which accepts only half-length boards, such as the internal modem).
[6] An optional piggyback unit ($199) provides two 8/16-bit slots.
[7] Compatible with AT&T 6300's 640 by 400 graphics.

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TECHNICAL SUPPORT: through dealers
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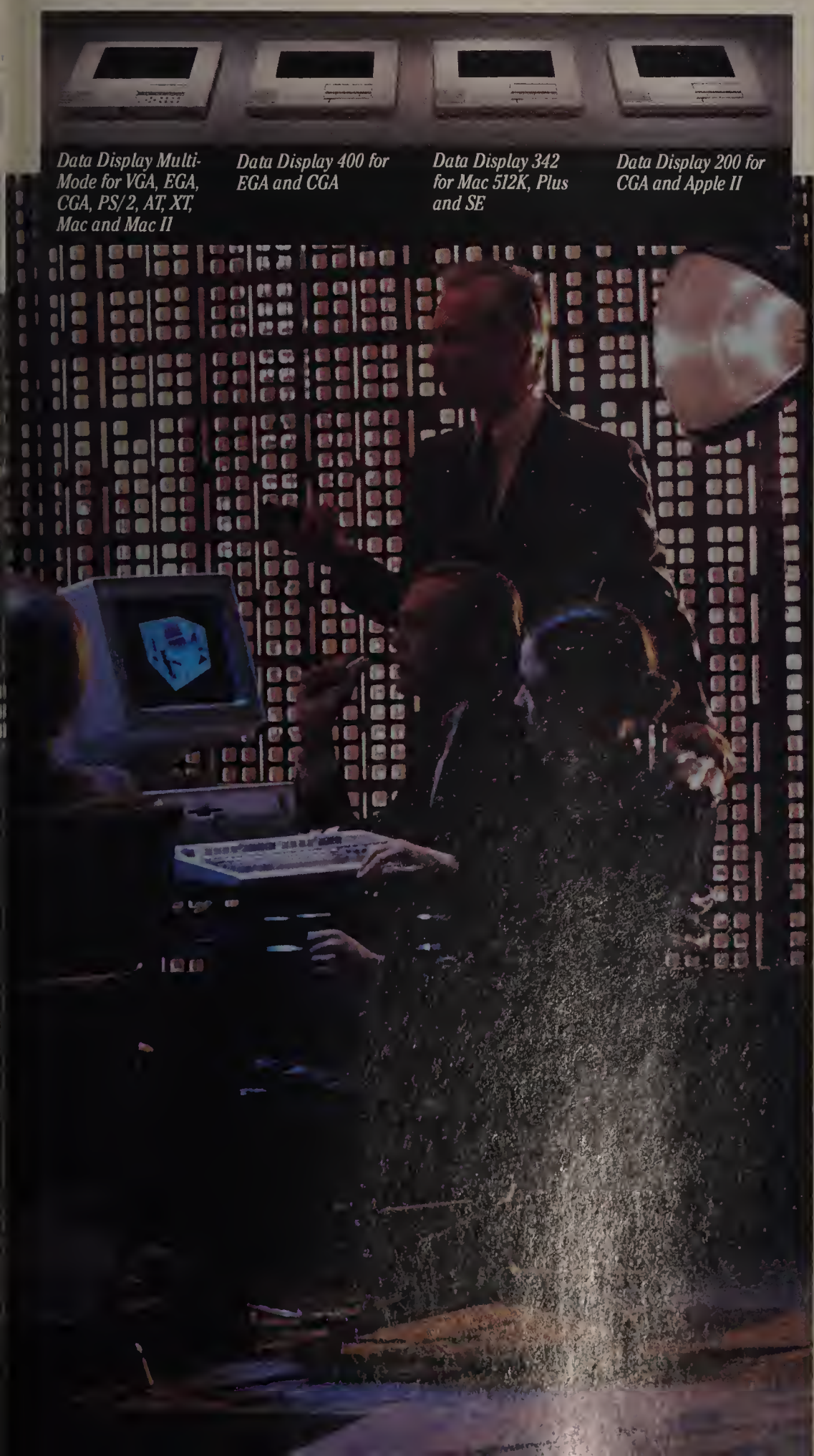

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Word Closes the Gap

With page preview and improved graphics handling, Microsoft Word 5.0 matches WordPerfect feature for feature.

Is Word good enough to take the lead?

George Campbell

Why is a superb word processor like *Microsoft Word* only a fraction as popular as *WordPerfect?* It's partly a matter of taste: Users seem to love *WordPerfect*'s function-key–driven interface, while many find *Word*'s nested menus annoying—though you can easily sidestep most of them. And people still think *Word* is slow, even though version 4.0 changed all that. But the program's most obvious problem is that it always seems to be a version behind *WordPerfect.*

The latest *Word* matches and in some ways surpasses its archrival. *Word 5.0*'s biggest catch-up efforts are page preview and graphics import, which debuted in *WordPerfect 5.0* over a year ago. Other long-awaited *Word 5.0* features include autosave, autopagination, an integrated spelling checker, and improved tabs and subdirectory support.

Word 5.0 really sets the pace with its new bookmark and annotation features, both of which promote smooth handling of documents on a LAN. Not coincidentally, there's no separate network version of *Word 5.0;* any copy can be installed on a network server, though the package's price remains $450 (Node Packs, which consist of documentation only, are $195 each).

Word 5.0 also runs under OS/2, where it looks and acts just like it does under DOS. When you install the program using the new, improved setup routine, you're simply offered the option of OS/2 installation. Under DOS, you'll discover that *5.0* occupies 384K—the same as *WordPerfect* but 64K more than *Word 4.0.* And like *WordPerfect, Word 5.0* adds expanded memory support.

Almost Desktop Publishing

The most glamorous *Word 5.0* feature is the ability to import and view graphics. Using the Library Link Graphics command, you can import .PIC, .PCX, TIF, or HPGL plotter files, along with PostScript and *Windows* Clipboard files.

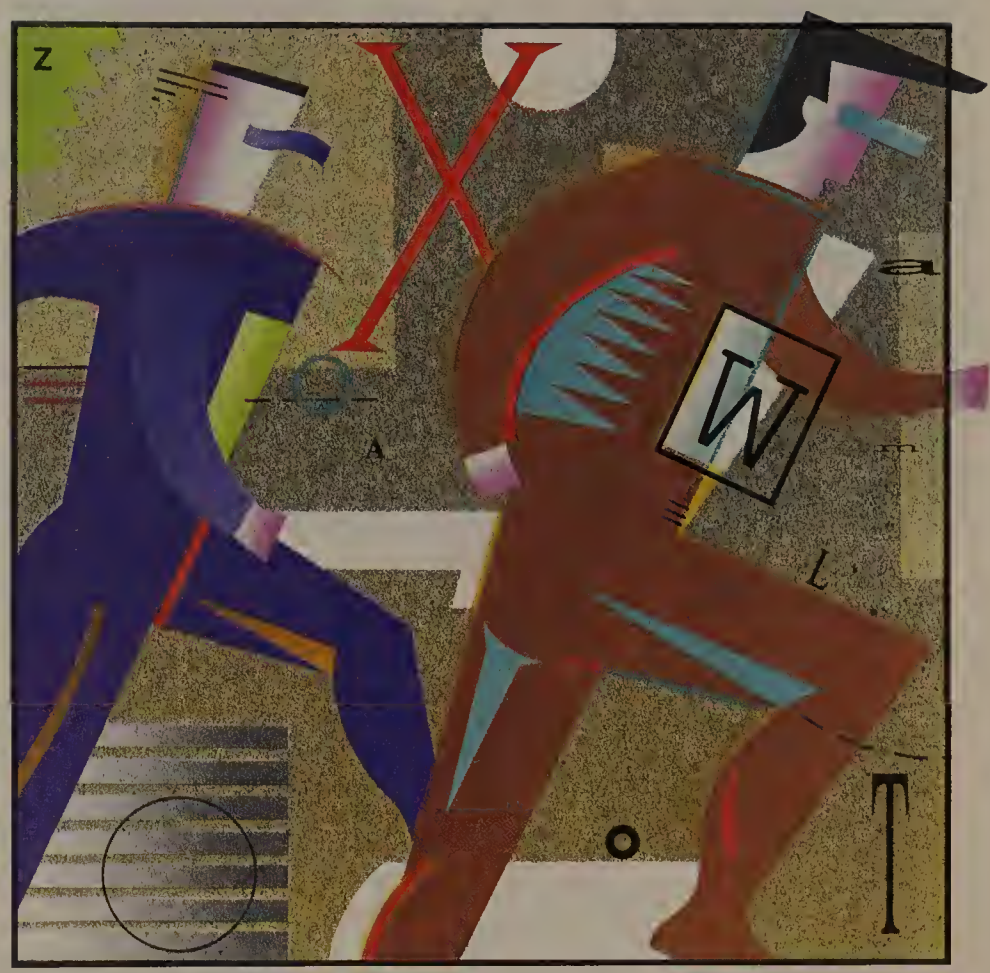
As with *WordPerfect*, you can freely position images and have text automatically wrap around them. You can also size a graphic, add a caption, and surround it with a box using one of four border styles. Both programs offer background shading for boxes as well as line-drawing functions, but only *Word 5.0* lets you alter a rule or box instead of making you delete it and start over. And vertical rules are a snap in *Word.*

Overall, however, *Word 5.0*'s graphics features can't equal *WordPerfect 5.0*'s. Unlike the other guy, *Word* can't crop or rotate images after you import them (though a separate utility lets you do this before you im-

port). Furthermore, *WordPerfect* includes 30 clip-art images, while *Word* forces you to find your own.

Word 5.0's page preview abilities parallel those of *PageView*, Microsoft's $50 add-on. You can display one or two full pages complete with graphics, headers and footers, page numbers, and illegibly small text. Neither *Word* nor *WordPerfect* supports text editing in this mode, but at least *WordPerfect* offers a zoom function. *Word* doesn't support kerning either, whereas *WordPerfect* offers limited kerning of large-size fonts.

Earlier versions of *Word* could create multiple columns but not show them on the screen. *Word 5.0* lets you see columns in preview mode, but it also offers a new Show Layout function under the Options menu to display columns in the normal editing window. The only drawback is that columnar editing slows scrolling and cursor movement.



STEVE LYONS

Marking the Spot

Word 5.0's bookmarks may coin a new buzzword: relational word processing. When you select and name a bookmark—which can be any text element in a document—it's almost like assigning a field name. At the simplest level, bookmarks are handy time-savers when you're moving around in long documents: Execute the Jump command and enter a bookmark name, and you return instantly to that bookmark position.

The real power of bookmarks lies in linking documents. For example, if you select and name a list of addresses in a source document as a bookmark, other documents can import that bookmark using the Library Link Bookmark command. Thereafter, changes in the source document's address list are instantly updated in the other documents.

Bookmarks also help cross-reference passages of text within a document. If you reference a passage in a document by bookmark name, *Word* replaces the name with the page number when the document prints. (For more information on bookmarks, see "Linking Files With Word 5.0" in the How To section of this issue.) You can also cross-reference footnotes, paragraphs, and items in a series—such as tables, figures, or sections.

Word 5.0's new annotation feature, which targets group document processing, closely resembles footnoting. It's a snap to insert your personal annotation marks in text; *Word* then sends you to the end of the document, where you key in footnotelike annotations, which are numbered sequentially. With the Window Split Footnote command, you can scroll text and annotations in tandem for convenient group document review.

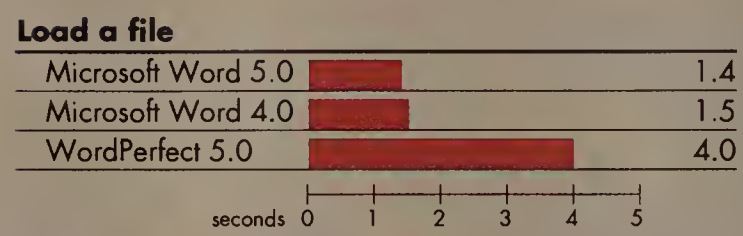
Changed by Popular Demand

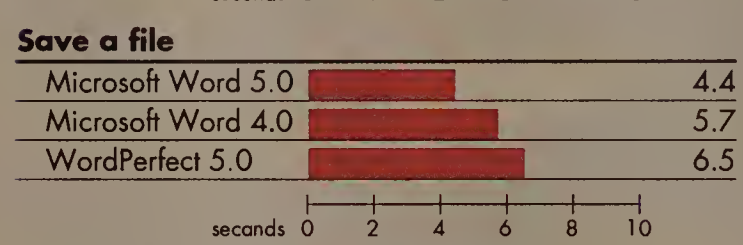
For many users, the most important improvements in *Word 5.0* won't be high-profile features like graphics support, page preview, or bookmarks. They'll be things like automatic file saving (at a user-defined interval) or a new archiving function that lets you collect groups of files by date and time for floppy backup. And if you're tired of having to

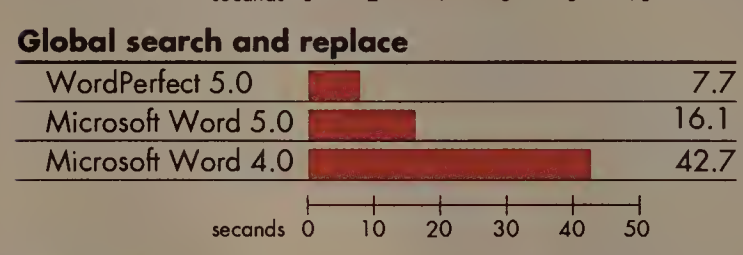
NSTL TEST REPORT

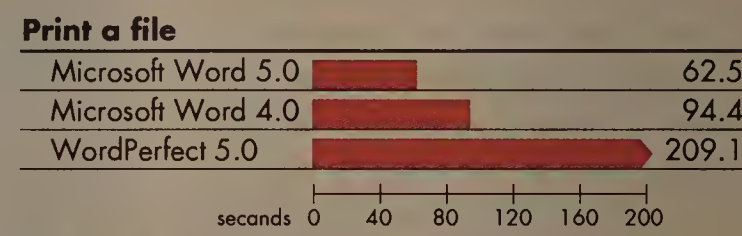
Word 5.0 Sets an Even Faster Pace

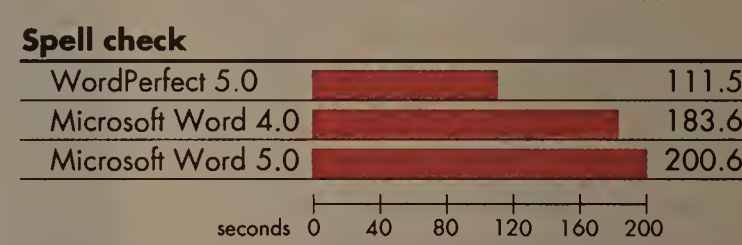
Word was already swifter than WordPerfect—now Word 5.0 extends this lead. Printing and search and replace get an extra-healthy boost.

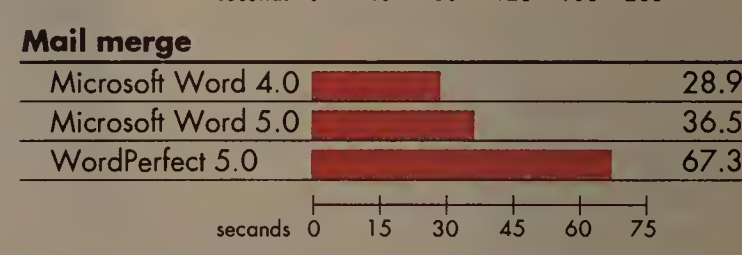












Methodology
Tests were canducled an a 12-MHz Campaq Deskpra 286 with 1MB RAM, DOS 3.3, and a 20MB hard disk. All tests were timed fram the commond ta initiate the test function until cantrol was returned ta the user.

Load a file
This test measured the time required ta laod o 53-poge document into the text editar.

Save a file
This test measured the time required to save o 53-poge document and cleor the screen.

Global search and replace
With the cursor positioned ot the beginning af a 53-poge document, the program wos instructed ta automatically reploce all 140 instances of *progrom name* with *progrom name v. 5.0* ond ta reformat and repoginote the document os necessary.

Print a file
A 53-page document was "printed" to a device thot simulates an infinitely fast printer, one not slawed by paper ar printheod movement.

Spell check
This benchmark measured the time a pragram's spelling checker required ta praof a 53-page document. Before the test was timed, words thot the program didn't recognize were added ta the user dictionary to ensure that the progrom checked the entire document withaut interruptian.

Mail merge
This benchmark meosured the time required ta merge a set of 20 oddress records in ASCII formot with a one-page farm letter cantaining 10 different merge fields, plus the time ta print the letters ta a device that simulates an infinitely fost printer using a Hewlett-Packard LaserJet Series II printer driver. The time required ta convert on ASCII file ta o proprietory formot was odded ta the print time.

Data based on tests designed and conducted by National Software Testing Labaratories (NSTL). All rights reserved.

remember path names when loading a document from someplace other than your work directory, *Word 5.0* now lets you easily navigate directories and drives from the Transfer Load Filename prompt.

Word 5.0's macro language adds AND and OR to its logical operators, plus improved variables, data types, and string manipulation for better interactive macros. You also get a file containing 40 macros for everything from printing envelopes to creating an index. And while *WordPerfect* can handle 26 <Alt>-*key* macros, *Word* can store over 1000 <Ctrl>-*key* macros per glossary file.

Users looking for vast improvements in macro editing, however, will be disappointed. Unlike *WordPerfect*, which lets you insert commands from a pick list, *Word 5.0* still forces you to type them, complete with pesky chevron characters. In addition, macros execute more slowly than in *WordPerfect*.

Word's spelling checker was overdue for an update, and *5.0*'s delivers. Now you can check and replace a single word in context

EXECUTIVE SUMMARY

Microsoft Word 5.0

Word processor

Ward 5.0 now lets you preview pages and import graphics, thaugh with a little less elegance than WordPerfect. New feotures for linking and managing documents represent a patentiol baan for netwarked users. Enhancements like integroted spell checking, autosove, autopagination, impraved tabs, and full subdirectary suppart raund aut a fine package.

	POOR	FAIR	GOOD	EXCELLENT
Editing				●
Formatting				●
Graphics				●
Printing				●
Performance			●	
Overall value				●

Reader service no. 630

from a list of alternatives, and check the whole file without exiting the document.

At long last, *Word* automatically repaginates documents, so you can see page breaks change as you type. Unfortunately, the page breaks shift slowly enough to bog down rapid text entry, so you may want to switch back to the old manual method (an option not offered by *WordPerfect*).

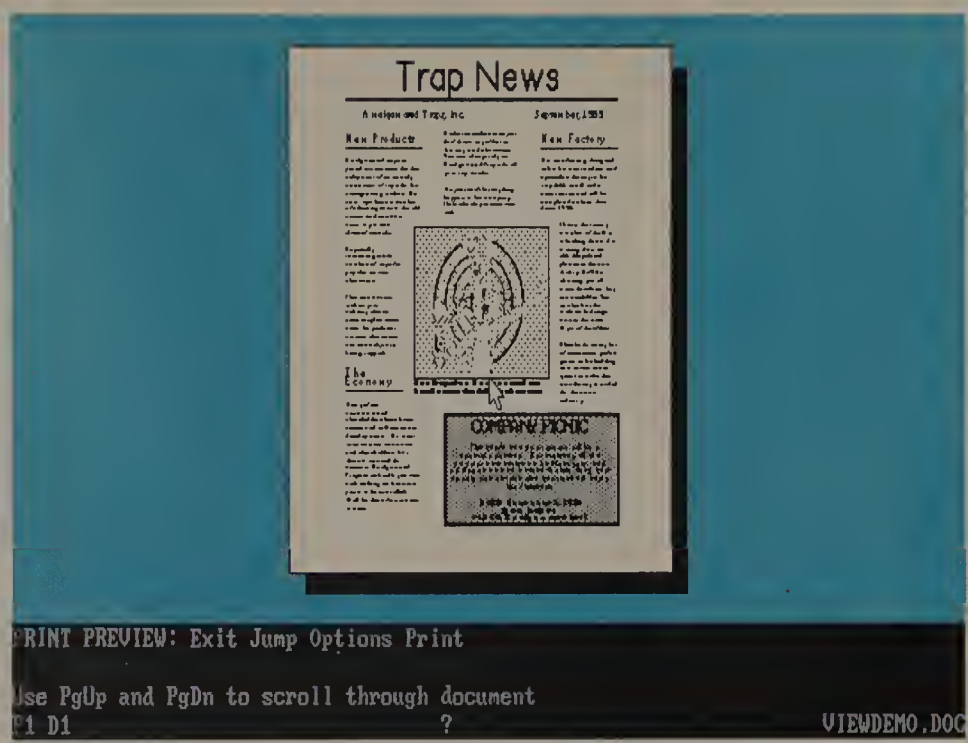
Superlative printer control, complete with point-and-shoot font lists, has always been a *Word* plus. The new version builds on this tradition by letting you mix portrait and landscape modes in the same document, and improves PostScript support by supporting all fonts in sizes from 2 to 127 points. In addition, the program adds support for more than 50 new printers.

Word 5.0 has undergone too many commonsense tweaks to mention here. The most obvious is that all global options have been moved from the Windows menu and consolidated under the Options menu. Users who like to customize their interface will appreciate enhanced color control over text, menus, and borders. Most welcome, though, are the improved tabs: You can now change tabs on the ruler with either the cursor or mouse, and see the text change instantly.

A Personal Choice

The 5.0 versions of both *Word* and *WordPerfect* present new opportunities. Neither comes close to replacing *PageMaker* or *Ventura Publisher* for desktop publishing, but both can now crank out a simple in-house newsletter. *WordPerfect*'s graphics capabilities give it a slight edge in this department.

Word 5.0's trump card is superior group-document handling. As more and more users find themselves networked, features such as numbered annotations and document linking through bookmarks will show their true benefits. In the meantime, *Word* users will relish the long list of small improvements, but



Word 5.0 adds page preview, which displays both text layout and any imported graphics. A two-page view is also available.

NSTL BENCHMARK TESTING

The exclusive test facility for *PC World*, **National Software Testing Laboratories (NSTL)**, is an independent organization that specializes in evaluating personal computer hardware and software. A recognized pioneer in state-of-the-art test design, **NSTL** believes that the most useful benchmark tests measure how well products perform when executing typical business tasks. **NSTL** testers follow detailed test plans that simulate normal operating conditions. A controlled testing methodology ensures objective, accurate, and consistent results and gives consumers a sound basis for making purchase decisions. **NSTL** publishes its test results in *Software Digest Ratings Report*® and *PC Digest*.™ Neither publication accepts advertising. **NSTL** is located in Philadelphia, Pennsylvania.

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FEATURES EVALUATION

Word 5.0's New Ingredients

The latest Word delivers most of the graphics import and page preview features of WordPerfect 5.0. The new bookmark and annotation features, which offer greater possibilities for document management, are Word firsts.

● Yes
○ No
◒ Deficient

Editing	Word 5.0	Word 4.0	WordPerfect 5.0
Maximum number of windows	8	8	2
Undo command	●	●	●
Jumps to bookmark	●	○	○
Links to bookmarks	●	○	○
Links to spreadsheet range	●	○	○
Temporarily exits to DOS	●	●	●
Wild-card search	●	●	●
Spelling checker/thesaurus	●	●	●
Annotations	●	○	●
Automatic timed save	●	○	●
Cross-referencing	●	○	●
Redlining/revision marking	●	●	●
Outliner	●	●	◒[1]
Mail merge	●	●	●
Creates index	●	●	●
Creates table of contents	●	●	●
Macros	●	●	●
Learn macros	●	●	●
Macro editor	●	●	●
Macro programming language	●	●	●
Mouse support	●	●	○
Context-sensitive help	●	●	○
Access tutorial while editing	●	●	○

[1] Can't collapse heading or expand to show document's text.
[2] Imports printer-ready files only.
[3] Crops and rotates graphics with screen-capture utility only.

Formatting	Word 5.0	Word 4.0	WordPerfect 5.0
Style sheets	●	●	●
Conditional page breaks	●	●	●
Widow/orphan control	●	●	●
Automatic hyphenation	●	●	●
Leading control	●	●	●
Decimal tabs	●	●	●
Snaking columns	●	●	●
Side-by-side columns	●	●	●
Columns display on screen	●	○	●
Graphics			
Imports graphics	●	◒[2]	●
Displays graphics	●	○	●
43/60-line display	●	●	○
Sizes/crops/rotates graphics	◒[3]	○	●
Flows text around graphics	●	○	●
Graphics page preview	●	○	●
Zoom	○	○	●
Line drawing	●	●	●
Text boxes/borders	●	●	●
Captures graphics	●	○	●
Printing			
Proportional spacing	●	●	●
Queues documents	●	●	●
Prints in background	○	○	●
Landscape printing	●	●	●
Supports PostScript	●	●	●

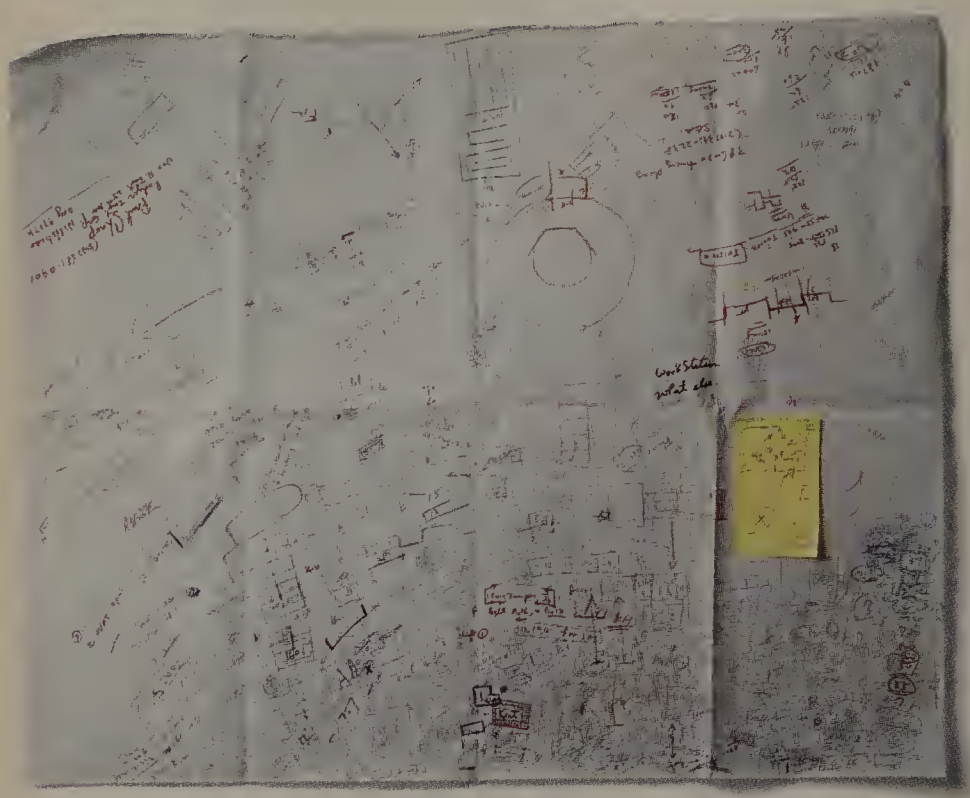
few *WordPerfect* users are likely to switch to *Word* because of the changes in *5.0.* ●

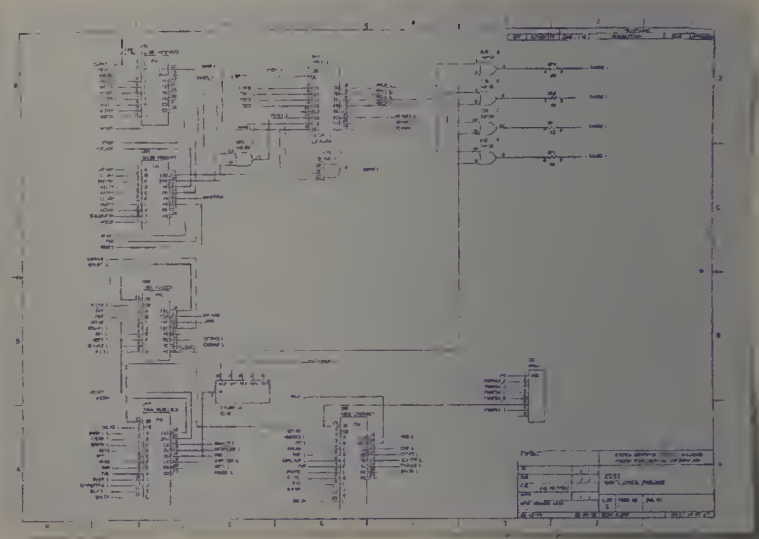
George Campbell is a columnist for Compute's PC Magazine *and a freelance writer in Los Osos, California.*

WHERE TO BUY

Microsoft Word 5.0
Microsoft Corp.
16011 N.E. 36th Way
Box 97017
Redmond, WA 98073
800/426-9400, 206/882-8080
LIST PRICE: $450, upgrade $75 (free for purchasers of Word 4.0 after October 1, 1988); Network End-User Pack $195
REQUIREMENTS: 384K (512K recommended), two floppy drives (hard disk recommended), DOS 2.0 or later version or OS/2 1.0 or later version
TECHNICAL SUPPORT: unlimited, no toll-free number, M–F 6 a.m.–9 p.m.
OTHER SUPPORT: bimonthly newsletter, GEnie and CompuServe forums
Reader service no. 630

Several steps ahead of the competition.





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Circle 70 on reader service card

The 32-Bit Question: 286 or 386SX?

Cheap, high-speed 80286 systems are tempting performers.

But we've seen some low-priced systems with a future—and they're built around the 80386SX.

John Diebold

Once it was easy to figure. You could save money and buy a relatively slow 80286-based system, or pony up bigger bucks for a fast 80386 that would run multitasking software like *Windows/386*.

But now that systems based on Intel's 80386SX chip provide support for tomorrow's software at yesterday's prices, and high-speed 80286 systems deliver 16-MHz performance and up, buying smart has become more complicated.

To help you make the best decision, *PC World* pitted four 16-MHz 80286s (the Arche Rival 286-16, the Everex Step 286/16, the Mitac Paragon 286/VE, and the Wyse PC286 Model 2116-01) head-to-head against four 16-MHz 80386SXs (the ALR FlexCache SX386Z, the Club AT 316SX, the Everex Step 386is, and the NCR PC916SX).

The primary issues in making a buying decision between an 80286 machine and 80386 machine running at the same clock speed include the speed of the math coprocessor, OS/2 efficiency, and the ability to run 32-bit software.

Intel licenses AMD and Harris to make 80286 chips but not 80287s. So while these third parties have released 80286s that run at clock speeds of up to 25 MHz, the fastest 80287 available has been Intel's 10-MHz chip, hobbling potential system performance for CAD and other math-intensive applications. (Other options are emerging; see the sidebar "A Chip off Intel's Block.") No such problem hampers the 16-MHz 80386SX, because Intel released it with a matching 16-MHz 80387SX.

As for OS/2, speed benchmarks run by National Software Testing Laboratories (NSTL) reveal that 16-MHz 80286 and 80386SX machines deliver roughly equivalent performance. (With several exceptions, noted in text, each machine was tested with the version of OS/2 provided by its vendor.) The main limitation here is CPU-speed memory capacity, since OS/2 needs at least 4MB of such memory (6MB is better) to adequately run many applications. Interestingly, some

386SXs have less CPU-speed RAM capacity than some 286s.

The crucial difference between the two chips, and the computers based on them, is their ability to run 80386-specific software, such as *Windows/386* and the forthcoming 32-bit version of OS/2. None of this software will run on an 80286 system at *any* speed, thus ruling out the multiple DOS sessions and efficient access to extended memory that 32-bit applications offer.

To level the playing field, we priced each machine in this roundup in a standard *PC World* configuration: 2MB of CPU-speed RAM, at least one floppy drive, one 40MB hard disk, a VGA video board and VGA color monitor, at least one parallel and one serial port, a 101-key keyboard, and DOS 3.3 or a later version. All but one (the NCR PC916SX) come in a small-footprint case.

16-MHz 80286 Systems

The four 16-MHz 80286 computers in this roundup all cost $4967 or less in the *PC World* configuration—and so do two of the 80386SX systems. The Everex Step 286/16 is the fastest machine in the roundup, though it lagged noticeably behind the 80386SX machines in the *AutoCAD* tests. Most of these systems outperform the original SX machine, the Compaq Deskpro 386S (see "Compaq and IBM: Faster, Top to Bottom," *PCW*, October 1988).

EXECUTIVE SUMMARY

Arche Rival 286-16

AT-compatible system

This is a solid machine at a reasonable price, with an above-average capacity far expansion boards and CPU-speed memory, but its performance is unimpressive.

	POOR	FAIR	GOOD	EXCELLENT
Memory bus capacity			●	
Expandability			●	
Ergonomic design			●	
Performance			●	
Overall value			●	

Reader service no. 660

JOHN GREENLEIGH

Club AT 316SX makes a very smart buy thanks to low price, high capacity for CPU-speed RAM, and strong performance.

Arche Rival 286-16

The Arche Rival 286-16 is a bit of a nonentity in this fast crowd. While it provides a comfortable 8MB ceiling for CPU-speed RAM, plenty of slots, and a two-year warranty, it delivers unexciting performance at a midrange price ($4490 in the *PC World* configuration).

The proprietary motherboard holds 4MB of RAM; another 4MB can be installed by way of a special memory slot and a proprietary expansion board and accessed at full CPU speed.

The Arche Rival's board capacity is above average. You start out with six 8/16-bit slots and two 8-bit slots; after installing all the boards necessary to reach the *PC World* configuration, you are left with five 8/16-bit slots free—a good count for a small-footprint system. The Rival's case has three half-height 5¼-inch device bays, two of which are accessible from the outside.

FEATURES EVALUATION

386SX Systems Deliver Top Value at 16 MHz

Club AT's 316SX offers premier memory bus capacity and ample space for expansion boards at a rock-bottom price. The Everex Step 386is is somewhat pricier (and significantly stingier with CPU-speed bus RAM capacity) but boasts sizzling performance. Moreover, as the table shows, 80286 systems no longer enjoy a significant price advantage.

● Yes
○ No

	Arche Rival 286-16	Everex Step 286/16	Mitac Paragon 286/VE	Wyse PC286 Model 2116	ALR FlexCache SX386Z	Club AT 316SX	Everex Step 386is	NCR PC916SX
Standard features								
Price[1]	$4490	$4197	$4137	$4967	$5337	$3179	$4497	$7339
CPU	80286	80286	80286	80286	80386SX	80386SX	80386SX	80386SX
CPU speed (MHz)	16/8	16/8/5	16/8	16/8	16	16	16/8/5	16
Coprocessor support	80287-10	80287-10	80287-10	80287-10	80387SX-16	80387SX-16	80387SX-16	80387SX-16
Disk-coching softwore	●	●	○	●	●	○	●	○
Built into motherboord								
Porollel port	○	○	●	○	●[2]	○	○	○
Seriol port	○	○	●	○	●[2]	○	○	○
Floppy disk controller	○	○	●	○	●[2]	○	○	○
Video odopter	○	○	●	○	○	○	○	○
Mouse port	○	○	○	○	○	○	○	○
CPU-speed RAM								
Copocity	8MB	4MB	8MB	4MB	8MB	16MB	4MB	5MB
Expandability								
8/16-bit expansion slots/ number free	6/5	6/5	5/4	6/4	5/3	4/2	6/5	6/4
8-bit exponsion slots/number free	2/0	2/0	1/1	2/0	1/1	4/3	2/0	2/2
Half/full-height storoge device boys	3/1	3/1	4/1	3/1	4/1	3/1	3/1	5/1
300MB or lorger hord disk ovoiloble from monufocturer	○	●	○	●	○	●	●	○
Ergonomic design								
Switchless setup	●	●	●	●	●	○	●	●
Compoct footprint	●	●	●	●	●	●	●	○
Complete documentation	●	●	●	●	●	○	●	○
Tilt-and-swivel monitor	●	●	●	●	●	●	●	●
Front-ponel reset button	●	●	●	●	○	●	●	○
Front-panel on/off switch	○	○	●	●	●	○	○	●

[1] Price is based on 2MB RAM, one flappy drive, one 40MB hard disk, a VGA boord and color monitor, one parallel and one serial port, a 101-key keyboord, and DOS 3.3 or a later version.

[2] Built into passive backplane.

The Rival's performance scores fall toward the bottom of the chart, however, on both the DOS and OS/2 tests. Arche doesn't have its own version of OS/2, so we had to use several third-party versions, including Tandy 1.0 and IBM 1.0, to complete the test suite; Compaq OS/2 1.0, our usual "generic" OS/2, would not boot. (To avoid potential compatibility problems, we advise against using any system with a version of OS/2 not specifically supported by the vendor.)

The Rival comes with more than the standard extras, including disk caching, switchless setup, and an unusual two-year carry-in warranty. It also delivers lots of slots, all at a price that won't make your accountant blanch. But you can find better performance—as well as 32-bit capability—elsewhere for the same price or less.

Everex Step 286/16

For the fastest system in this roundup, the Everex Step 286/16 comes at a surprisingly low price—a mere $4197 in the *PC World* configuration. The only troubling aspect is the machine's cramped 4MB CPU-speed RAM ceiling.

The key to the Step 286/16's speed is its use of RAM chips fast enough to be accessed at true zero wait states without interleaving or paging. Although the 4MB limit on CPU-speed RAM may be low, expansion capacity is high. The motherboard holds six 8/16-bit and two 8-bit slots; in the *PC World* configuration you still have five 8/16-bit slots free. The case has space for three half-height 5¼-inch device bays, two of which are externally accessible.

The Everex Step 286/16 turns in truly blazing performance. It takes top spot on every NSTL DOS benchmark except *AutoCAD*, where its 10-MHz coprocessor puts it at a disadvantage. Its OS/2 scores (using Everex OS/2 1.0) are almost as strong.

Despite the bargain price, Everex isn't stingy with extras, which include QuickStep (Everex's version of the excellent *PC-Kwik* disk-caching utility), setup routines built into ROM, and a one-year, on-site service contract.

The Everex 286/16 is a tempting choice, even for an 80286. Not only is it the speed champ, it's also one of the cheapest systems we looked at and comes with free house calls. Only its low 4MB CPU-speed RAM limit is disappointing. Ironically, the best argument against buying the Step 286/16 is its 386SX sibling, the Everex Step 386is, which costs a mere $300 more.

Everex Step 286/16 turns in top speed scores, but its SX twin will run 80386-specific software and costs only $300 more.

JOHN GREENLEIGH

EXECUTIVE SUMMARY

Everex Step 286/16

AT-compatible system

This 80286 speedster is the fastest machine in the roundup—and its price is surprisingly low. But you can get its 80386SX twin (which runs almost as fast) for only $300 more.

	POOR	FAIR	GOOD	EXCELLENT
Memory bus capacity	●			
Expandability			●	
Ergonomic design			●	
Performance				●
Overall value			●	

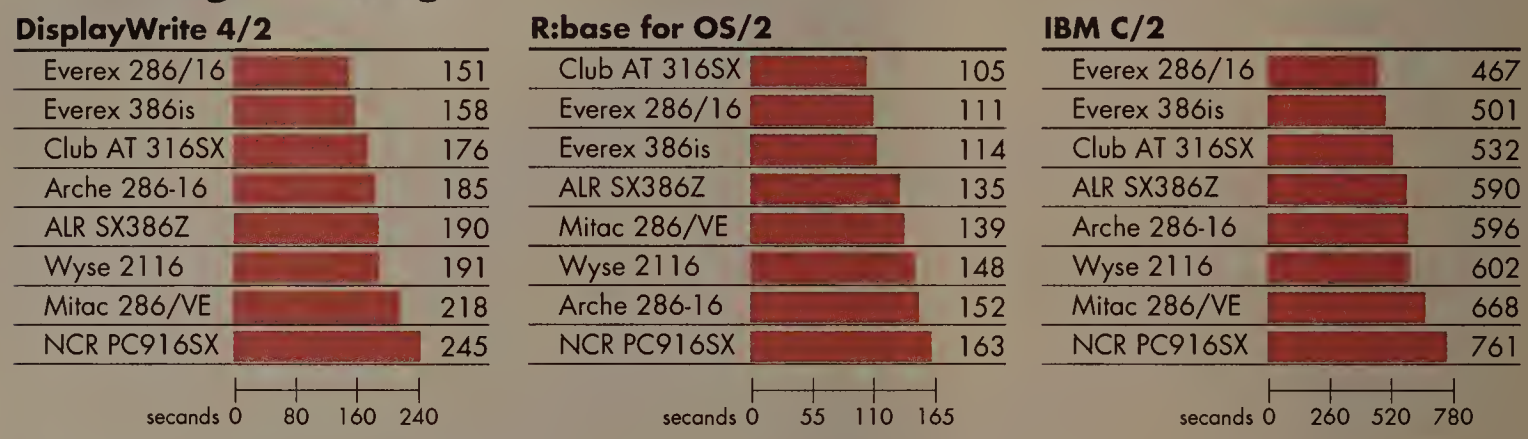
Reader service no. 661

NSTL TEST REPORT

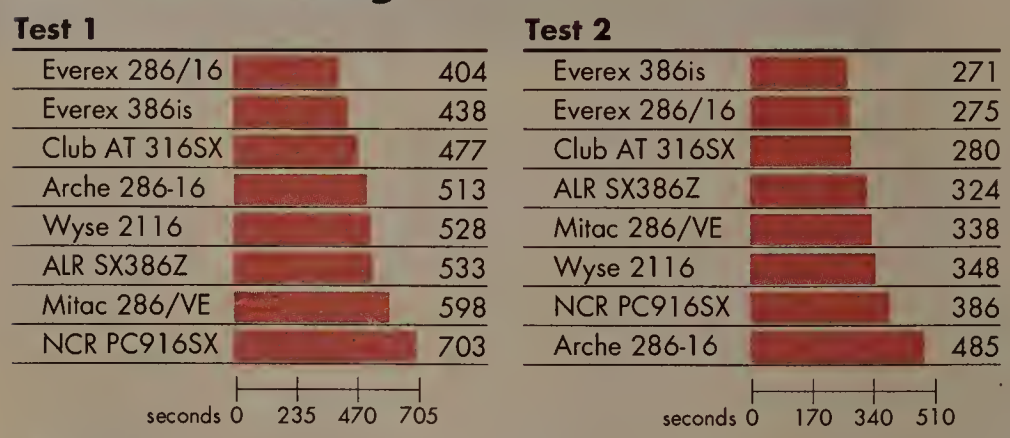
286 Versus 386SX—Balance of Power

At identical clock speeds, 286 machines can easily keep up with their 386SX counterparts. In nearly every OS/2 and DOS test, Everex's Step 286/16 beat all the other machines, including the company's SX-based 386is—but there's more to a smart buy than mere performance.

OS/2 Single-Tasking



OS/2 Multitasking



Methodology
All machines were tested with 4MB of RAM, a coprocessor, and a 256K disk cache in extended memory (except in the *1-2-3* benchmark, which used no coprocessor or 256K cache).

DisplayWrite 4/2
Although the hard disk access rate plays a small part in this benchmark, processing and memory access speeds are the most significant factors. Memory architecture affects memory access speed: Systems that require additional memory in standard expansion slots to run OS/2 exhibit below-average performance.

While *DisplayWrite 4/2* is loading, the keystrokes to start a *DisplayWrite* macro are entered. The macro loads a 35-page, 140-paragraph document, replaces each occurrence of the word *today* with *tomorrow*, uses the built-in spelling checker to look for any incorrectly spelled words (there are none), paginates the document, prints the first page to an IBM Proprinter II, and exits *DisplayWrite*.

R:base for OS/2
Processing and hard disk random access speeds are the most significant factors in this benchmark. Disk caching dramatically improves apparent disk access speed. This benchmark measures the time it takes to produce a report based on a three-file join, select, and sort.

IBM C/2
In this benchmark, processing and hard disk sequential access speeds are the most important factors. The benchmark measures the time required to compile the 25 source code files that make up *XLISP*, a public-domain LISP interpreter.

Mitac Paragon 286/VE

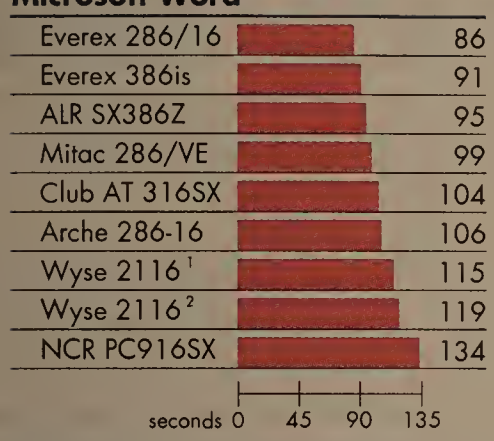
American Mitac's Paragon 286/VE is an impressive piece of hardware—except for its performance. At $4137 (in the *PC World* configuration), it's the least expensive 80286 in this roundup. It comes with one 1.2MB 5¼-inch and one 1.44MB 3½-inch floppy drive, simplifying data transfer between formats. It also boasts a motherboard with built-in I/O ports, a floppy controller, and a VGA board.

The Paragon can address a generous 8MB of CPU-speed RAM, making it a possible OS/2 contender; unfortunately, its OS/2 speed scores (using Compaq OS/2 1.0) were in the bottom half of the pack. It did somewhat better running under DOS, where it placed a little above the mean.

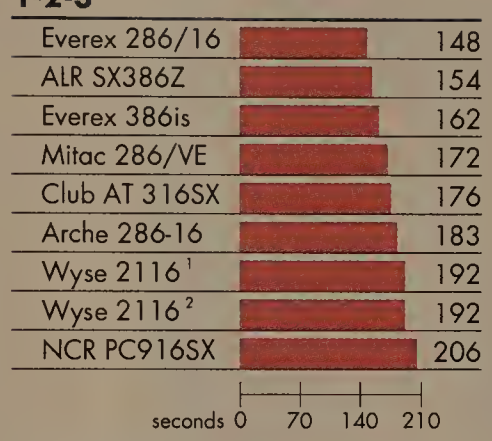
The 286/VE offers excellent slot and de-

DOS

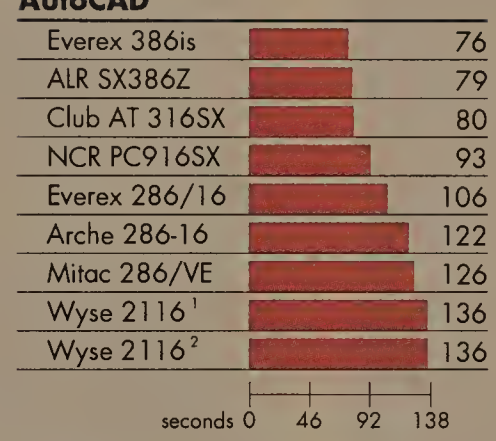
Microsoft Word



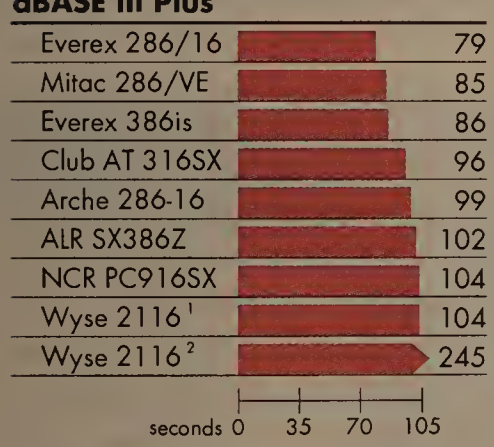
1-2-3



AutoCAD

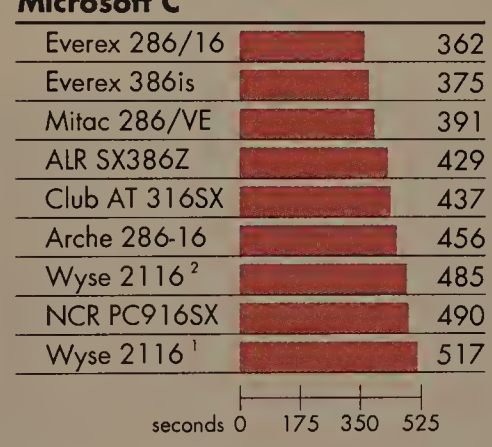


dBASE III Plus



[1] Tested with Multisoft Super PC-Kwik disk caching.
[2] Tested with Wyse Cache disk caching.

Microsoft C



OS/2 multitasking test 1
In two sessions, IBM *C/2* compiles the 25 C source code files that make up *XLISP*. The results of this benchmark are determined by calculoting the difference between the first session's starting time and the second session's ending time.

OS/2 multitasking test 2
This test includes the single-tasking *R:base for OS/2* benchmark alang with twa sessians of *Paradox far OS/2*. All sessions are run in the background. The two *Porodox for OS/2* sessions are storted first, while the *R:bose* session automatically starts 15 seconds later. The results of this benchmark are determined by calculating the difference between the starting and ending times for the *R:base for OS/2* benchmark.

Microsoft Word 4.0
A *Microsoft Word* macro laads a 35-page, 140-paragraph dacument and performs search-and-replace and spell-checking operations. The first page of the document is then printed. Although the results of the benchmark depend primarily an processor and memory access speeds, display adapter and hard disk speeds are also contributing factors.

1-2-3 2.01
In this benchmark, a *1-2-3* macro executes a series of recalculatians using five different formulas within a 75-by-75-cell matrix. Because there are few screen updates and na disk access is required, the results depend almost entirely on processing and memory access speeds.

AutoCAD 9
In this benchmark, a three-dimensional sample drawing is retrieved and displayed using *AutoCAD*'s EGA driver. The zaam functian is used ta display the drawing from various perspectives; then the full drawing is printed. The results af the benchmark depend primarily on the speeds at which the processor and caprocessor aperate and at which memary is accessed. The performance of the display adapter and the hard disk alsa have some effect.

dBASE III Plus 1.1
The *dBASE III Plus* test measures the time required to prepare and print a report af past-due invoices. The report includes calculated fields and is based on three files: a 500-recard customer file, a 1000-recard invaice file, and a 2000-record item file. When disk caching is nat used, the random access speed of the hard disk is, after processor speed, the mast significant factor in this benchmark. With disk caching, sequential read performance becames mare important than random access.

Microsoft C 5.0
The *Microsoft C* benchmark measures the time required ta campile and link *XLISP*. The most important factors in this benchmark are processar and memory access speeds. The perfarmance af the hard disk is also a factor; generally, disk caching has little effect.

Data based on tests designed and conducted by National Software Testing Laboratories (NSTL). All rights reserved.

vice capacity. The motherboard sports five 8/16-bit slots and one 8-bit slot; with the hard disk controller occupying one of the 8/16s, you end up with a total of five slots free. The case has room for four half-height drives—one more than any other 80286 in the round-up. Three of the bays (two 5¼ inch and one 3½ inch) are accessible from the front.

The Paragon's low list price doesn't include disk-caching software, but you do get a package of extended-VGA drivers, along with a disk-partitioning utility and expanded memory management software.

Despite its relatively unimpressive performance, the Paragon 286/VE's low price, comfy RAM ceiling, double-format floppy drives, four-bay device capacity, and integrated motherboard add up to excellent value—for an 80286.

EXECUTIVE SUMMARY

Mitac Paragon 286/VE

AT-compatible system

This law-priced 80286 cames with one 5¼-inch and ane 3½-inch floppy drive, plus plenty af raam far baards and drives. It alsa offers respectable perfarmance, but you can get an 80386SX machine far even less.

	POOR	FAIR	GOOD	EXCELLENT
Memory bus capacity			●	
Expandability				●
Ergonomic design				●
Performance			●	
Overall value			●	

Reader service no. 662

Wyse PC286 Model 2116-01

At $4967 in the *PC World* configuration, the Wyse 2116 is the priciest 286 in the roundup. Unfortunately, its price is not justified by its sluggish performance, and its slot count is below average.

The 2116 sports an eight-slot backplane design (six 8/16-bit slots and two 8-bit slots) in which the CPU, support chips, and RAM are mounted on a special processor board that occupies one of the 8/16-bit slots. You can place up to 4MB of 100ns RAM on the processor board, but that's the limit for CPU-speed memory.

The slot and device capacity of this system could be better. With the processor board taking up a slot, only four 8/16-bit slots are left open in the standard *PC World* configuration. The case accommodates three stacked half-height 5¼-inch drive bays, all externally accessible.

If you're looking for speed, look elsewhere. The 2116 came in last or next to last on every NSTL DOS test. It did a little better running Wyse OS/2 1.0, placing in the middle of the pack. The extras, too, are underwhelming, considering the price of the system: You get disk-caching and setup utilities, period. In short, there's little to recommend this system. Given its high cost, low 4MB ceiling on CPU-speed RAM, substandard slot expandability, and poor performance, you could do a lot better.

Soon the SX machine will be the entry-level 80386 system of choice.

16-MHz 80386SX Systems

The more 80386-specific software that comes down the pike, the more obsolete 80286 systems will become. Soon, compatibility with these high-powered 32-bit applications offering access to gobs of extended memory (*without* OS/2) will make the SX the entry-level 386 system of choice.

SX machines cost almost as little to make as 80286s. The most obvious reason is that the 80386SX chip is in the 80286 price range. Also, the chips have the same number of address lines (24), allowing similar memory designs. More important, the 80386SX, like the 80286, accesses data 16 bits at a time, and thus SX motherboards need only half the data lines of full-blown 80386 motherboards. That means the 386SX motherboard is cheaper to build (due to fewer data lines); more to the point, manufacturers can turn out an SX motherboard with only minor alterations to an existing 80286 design.

Price is the SX's only advantage over a bona fide 80386 machine, and (except for those rare individuals who need more than 16MB of RAM) performance is its only mi-

EXECUTIVE SUMMARY

Wyse PC286 Model 2116-01

AT-compatible system

High price and law perfarmance cambine to make this 80286-based PC less than desirable. Baard and memary capacities are also belaw average.

	POOR	FAIR	GOOD	EXCELLENT
Memory bus capacity	●			
Expandability		●		
Ergonomic design				●
Performance		●		
Overall value		●		

Reader service no. 663

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nus. When the two chips run 32-bit instructions at the same speed, the SX is only half as fast at moving 32-bit instructions and data in and out of the CPU; fortunately, such transfers occur infrequently in most 80386-specific programs, so the penalty is slight. And the savings are significant. In the *PC World* configuration, prices for these 80386SX systems range from $3179 for the amazing Club AT 316SX to $7339 for the less impressive NCR PC916SX.

ALR FlexCache SX386Z

At $5337 in the *PC World* configuration, the ALR FlexCache is the roundup's second-most-expensive system. Its DOS performance is good, however, thanks to memory caching; you can expand CPU-speed RAM to a comfortable 8MB; and you get a healthy drive capacity for a small-footprint case.

The SX386Z uses a six-slot backplane design, with five 8/16-bit slots and one 8-bit slot. The processor board (which is socketed for a coprocessor and up to 8MB of CPU-speed RAM) and the VGA board take up two 8/16-bit slots, leaving four slots vacant—not much, even for a small-footprint system. Device capacity is better, with one 3½-inch bay and two stacked 5¼-inch bays that are all accessible from the front; another 3½-inch bay sits inside.

EXECUTIVE SUMMARY

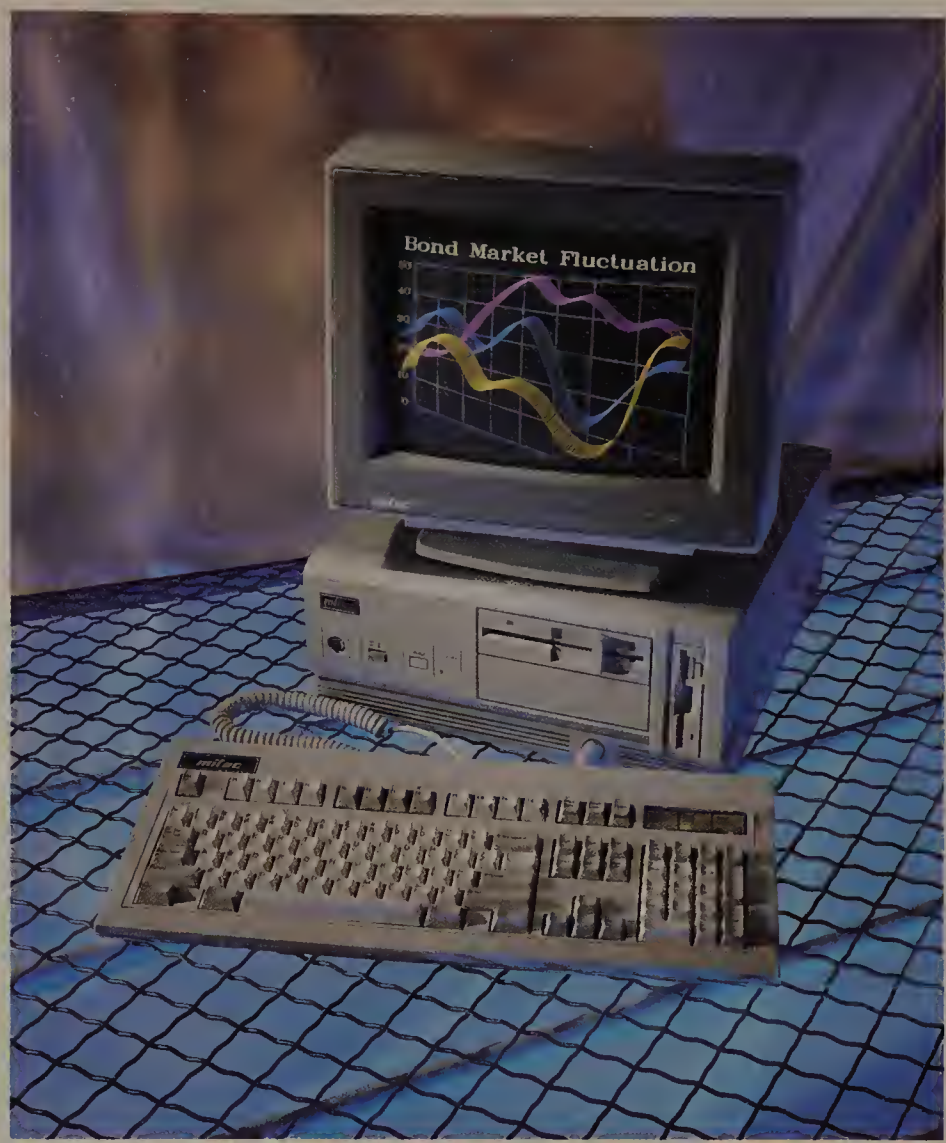
ALR FlexCache SX386Z

80386SX system

This system is one of the most expensive in the roundup, and it's a bit stingy with slots. But drive capacity is very good and performance is strong, making it the third-best choice here.

	POOR	FAIR	GOOD	EXCELLENT
Memory bus capacity			●	
Expandability			●	
Ergonomic design			●	
Performance				●
Overall value			●	

Reader service no. 664



Mitac Paragon 286/VE has VGA built into the motherboard and comes with two floppy drives, but performance is unimpressive.

The SX386Z's performance is impressive. It's the only system in the roundup to use memory caching, which results in near–zero-wait-state average memory access. In the DOS trials, the FlexCache took a strong third overall, coming in second on the CPU-intensive *1-2-3* and *AutoCAD* tests. It didn't do quite as well under Compaq OS/2 1.0, placing slightly above the middle of the pack.

The extras with this system, though, are first-class. ALR includes *Super PC-Kwik* disk-caching software and ROM-based setup and diagnostic routines.

Although hardly a bargain-priced system, the FlexCache SX386Z delivers value for the bucks: strong performance, good device expandability, and a comfortable 8MB ceiling for CPU-speed RAM. Nonetheless, smart buyers should consider the faster (and less expensive) Everex Step 386is, or the slower (but much cheaper) Club AT 316SX before making a decision.

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Club AT 316SX

This system seems too good to be true. Given its 16MB capacity for CPU-speed RAM (the largest in the roundup), respectable performance scores, and astonishingly low $3179 price (in the *PC World* configuration), you may be left shaking your head in disbelief. The system's only disappointment is its limited device capacity.

Club uses an Everex motherboard (not the same one used by either Everex system reviewed here) that holds 2MB of 100ns RAM. In addition, two special slots run at 16 MHz when filled with Everex's proprietary 8MB memory boards. (Although you can install up to 18MB, 80386SX CPUs address only 16MB.) If not used for memory, these slots can hold standard 8-bit expansion boards.

This switch-hitting makes the slot situation a bit complicated. Since the motherboard has six standard slots—four 8/16-bit and two 8-bit—plus the two special slots (not used in our configuration), you'll end up with two 8/16-bit and three 8-bit slots available.

The 316SX case houses three externally accessible half-height bays. With the floppy drive installed in one and a noisy full-height hard drive occupying the remaining two, there's no room for a tape backup unit or a second floppy drive.

ALR FlexCache SX386Z is fairly fast and delivers healthy device capacity, but it's a bit short on slots—and it's not cheap.

The 316SX turns in performance that would be welcome at any price. In the DOS events it placed in the top third of the pack. It did even better under Compaq OS/2 1.0, taking a strong third overall—including top spot on the *R:base* benchmark. (Unfortunately, Club does not yet provide its own version of OS/2.)

Moreover, given the 316SX's low price, you might expect cheesy construction, but the workmanship seems generally high-class. Cost-cutting is apparent only in the lack of extras: All you get in the way of software is a ROM-based setup routine, and the user manual is thin and distressingly elementary. Setup requires going under the hood and juggling motherboard jumper blocks to set base memory and monitor configurations.

Still, when it comes to the basics—price, performance, and RAM capacity—the Club AT 316SX delivers outrageous value. For

EXECUTIVE SUMMARY

Club AT 316SX

80386SX system

BEST BUY

With an amazingly low price, excellent performance, and the ability to address a full 16MB of CPU-speed RAM, the Club AT 316SX may strike you as too good to be true. The only drawbacks are limited space for drives and a clunky configuration.

	POOR	FAIR	GOOD	EXCELLENT
Memory bus capacity				●
Expandability			●	
Ergonomic design		●		
Performance				●
Overall value				●

Reader service no. 665

JOHN GREENLEIGH

Everex Step 386is is the second-fastest system tested and comes with free on-site service—all at a surprisingly low price.

such a low price, many will be willing to put up with limited device expandability and clumsy setup.

Everex Step 386is

The Everex Step 286/16 and Step 386is are virtual twins. They share top performance and, unfortunately, a low 4MB limit on CPU-speed RAM. (Slots and drive bays are described earlier in the Step 286/16 review.) About the only things they *don't* have in common are their CPU and price.

Although Everex won't let users make the upgrade themselves, the company has essentially pulled the 80286 out of the Step 286/16 and plugged in a daughterboard holding an 80386SX CPU, an 80387SX coprocessor socket, and various support chips. Some people have questioned the speed and reliability resulting from this strategy, but many engineers feel that the method is both safe and cost-effective. The Step 386is's price certainly proves the cost-effective part: In the *PC World* configuration, it costs only $4497, just $300 more than the Step 286/16.

A Chip Off Intel's Block

A new company called Integrated Information Technology (IIT) has developed a product that busts the 10-MHz speed limit for 80287 coprocessors. Dubbed the IIT-2C87, this chip boasts full pin and software compatibility with Intel's 80287 and comes with a 10-MHz or 20-MHz certification.

At press time we were unable to procure a production unit of the IIT-2C87 and so could not run formal tests of software compatibility. However, informal performance tests of a preproduction unit revealed that when we replaced an Intel 80287 with an IIT-2C87 in the Everex 286/16, our standard *AutoCAD* test (which relies heavily, though not exclusively, on numeric coprocessing) ran more than 20 percent faster.

The reason for the increased performance is twofold. First, the IIT-2C87 taps into the CPU's clock signal, causing it to run (in this case) at 16 MHz instead of 10. Second, the chip's additional registers enable it to execute the same floating-point instructions in fewer cycles. If IIT has its software compatibility act together, users—especially CAD users—will have one less reason to snub 80286 systems that run at 16 MHz and above.

—Eric Knorr

Eric Knorr is a senior editor for PC World.

EXECUTIVE SUMMARY

Everex Step 386is

80386SX system

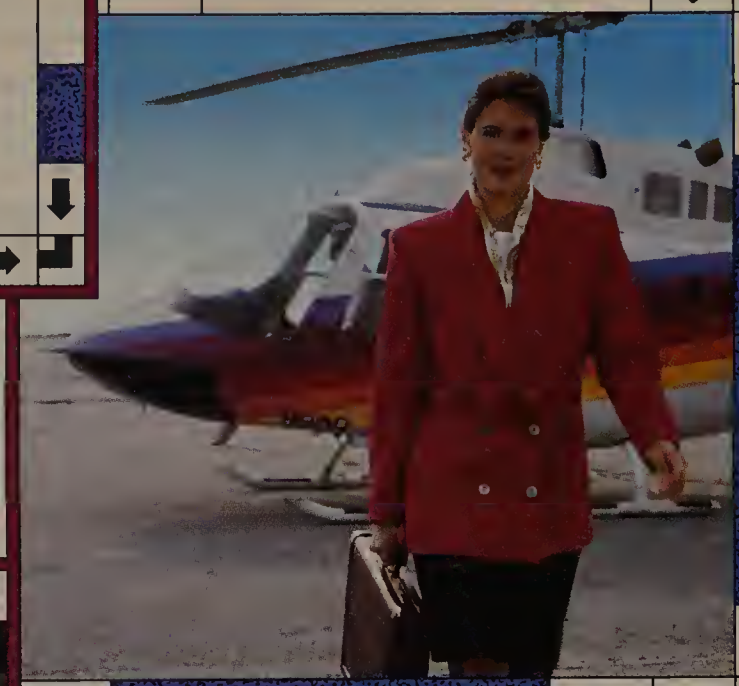
Terrific performance scores, good slot expandability, free on-site service, and a very low price make this system a strong contender. Unfortunately, its CPU-speed RAM maximum of 4MB is low for both OS/2 and 32-bit extended-memory applications.

	POOR	FAIR	GOOD	EXCELLENT
Memory bus capacity	●			
Expandability			●	
Ergonomic design			●	
Performance				●
Overall value			●	

Reader service no. 666

JOHN GREENLEIGH

"Number crunching's for when I'm in the office. Out here, just give me a great little PC. And I mean little."



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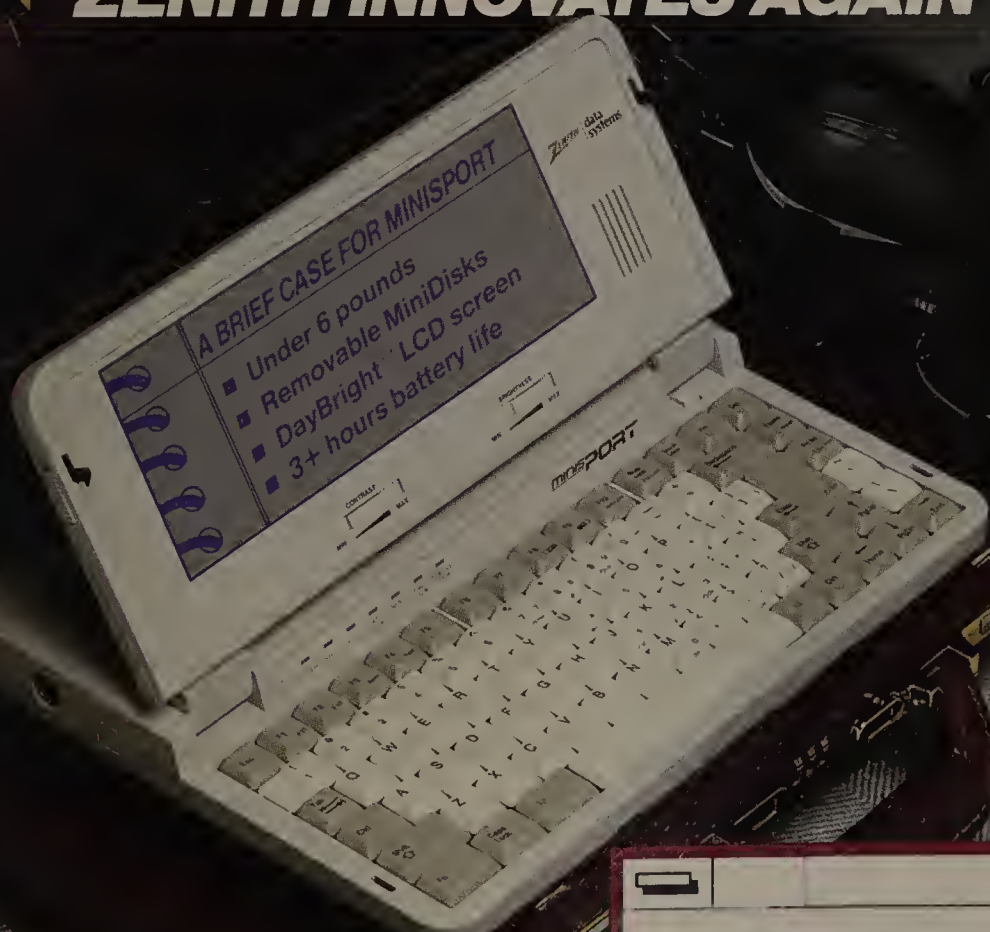

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The Everex Step 286/16 and Step 386is are virtual twins. About the only things they don't have in common are their CPU and price.

While the system is a bit slower than its 286 twin, the 386is still places first, second, or third in every DOS *and* OS/2 test (using Everex OS/2 1.0), ranking second overall. Low RAM limit aside, the Step 386is boasts high performance, low price, and Everex reliability, making it a good value.

NCR PC916SX

At $7339 in the *PC World* configuration, the NCR PC916SX is not only the most expensive system in the roundup, it's also the largest and slowest. The only bright spot here is the best slot and device capacity of any machine in the roundup.

The PC916SX has a backplane design with the CPU, 1MB of 80ns RAM, and a coprocessor socket all residing on a processor board. Another 4MB of CPU-speed RAM can be installed via a daughterboard that attaches to the processor board, raising the system-speed RAM ceiling to 5MB.

The PC916SX's large case leaves room for plenty of boards and drives. You get six 8/16-bit and two 8-bit slots. In the *PC World* configuration, you are left with four 8/16-bit and two 8-bit slots free—the highest capacity of any SX in the roundup. In addition, you get a full-height internal 5¼-inch drive bay, plus three half-height, 3½-inch drive bays, all accessible from the front panel. You'd expect this kind of capacity from an AT-size chassis.

The PC916SX turned in highly disappointing performance scores, however, coming in next to last overall in the DOS trials and last under Compaq OS/2 1.0. (Although NCR sells its own OS/2, it would not boot on NSTL's test unit, apparently because of a BIOS conflict.) Neither BASIC nor disk-caching software is included, and the owner's manual lacks an index. Plenty of room for boards and drives does not make up for this system's disadvantages and high price.

EXECUTIVE SUMMARY

NCR PC916SX

80386SX system

This large, overpriced PC provides outstanding slot and device expansion, but its maximum CPU-speed RAM is a low 5MB, and its overall performance is the worst in the roundup. For this much money, you might as well buy a full-fledged 80386.

	POOR	FAIR	GOOD	EXCELLENT
Memory bus capacity			●	
Expandability				●
Ergonomic design			●	
Performance			●	
Overall value			●	

Reader service no. 667

Low-Priced Tickets to the Future

If you don't plan to venture beyond light-duty word processing, single-file data management, or occasional telecommunications, an 80286 should keep you satisfied for some time, and in this case, two of the 80286 systems we reviewed are tempting. The Everex Step 286/16 tops them all in sheer performance. And the Mitac Paragon 286/VE, with its low price, twin floppy drives, and generous expandability, is equally hard to resist.

Given the relatively low prices of SX systems, however, it's silly to buy a system that rules out 80386-specific software. Three SX machines stand out: the very inexpensive Club AT 316SX ($3179), which offers a high 16MB ceiling for CPU-speed RAM, excellent slot capacity, and very respectable performance; the Everex Step 386is ($4497), which costs more and addresses only 4MB of CPU-speed RAM but is exceptionally fast; and the pricey ALR FlexCache SX386Z ($5337), which offers an 8MB CPU-speed RAM ceiling, excellent device expandability, and respectable performance.

Systems based on the 80386SX have fulfilled their promise of providing 32-bit capability at AT prices. At the 16-MHz level, there's little reason to consider anything less. ●

John Diebold is a marine geophysicist specializing in computer analysis of seismic data.

For more information about all products in this article, circle reader service no. 903.

(continues)

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WHERE TO BUY

80286 SYSTEMS

Arche Rival 286-16
Arche Technalagies, Inc.
48881 Kato Rd.
Fremont, CA 94539
800/422-4674
LIST PRICE: with 1MB RAM, 1.2MB flappy drive, monochrome graphics adapter ond manitar, twa serial ond two parallel ports, flappy/hard disk controller, 101-key keyboord, DOS 3.3, Arche Virus-Free $2395; with 44MB hard disk $3130; with VGA odapter and manitor $3145; with 2MB RAM $3005; with 4MB RAM $4225; with 44MB hard disk, VGA adapter and manitor, 2MB RAM $4490
ACCESSORIES: unpapulated high-speed 4MB memory-expansion baard $240
WARRANTY: two years limited, ports and lobor, carry-in
EXTENDED WARRANTY: nane
TECHNICAL SUPPORT: toll-free number, M–F 7:30–6
OTHER SUPPORT: nane
Reader service no. 660

Everex Step 286/16
Everex Computer Systems Divisian
48504 Kato Rd.
Fremant, CA 94538
800/356-4283
LIST PRICE: with 1MB RAM, 1.2MB 5¼-inch floppy drive, ane serial and one parallel port, floppy/hard disk controller, DOS 3.2, GW BASIC 3.2, QuickStep disk-caching softwore $2499; with 2MB RAM $2799; with 4MB RAM $3599
ACCESSORIES: 40MB hord disk $600, 80MB hard disk $900, 160MB ESDI hard disk $1750, 330MB ESDI hord disk $2999; 2MB RAM $1099; VGA adopter $299; VGA calar manitor $499, NEC MultiSync monitar $799; 80387-16 coprocessar $695; internal 2400-bps madem $249
WARRANTY: ane year parts and labar, an-site
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: no tall-free number, M–F 8–5
OTHER SUPPORT: BBS
Reader service no. 661

Mitac Paragon 286/VE
American Mitac Corp.
410 E. Plumerio Dr.
San Jase, CA 95134
408/432-1160
LIST PRICE: with 1MB RAM, 1.2MB 5¼-inch and 1.44MB 3½-inch floppy drives, VGA adopter, DOS 3.3 $2549
ACCESSORIES: 40MB hord disk $650, 100MB hard disk $1375; hard disk cantroller $69; VGA color manitor $549; 1MB RAM $320, 4MB RAM $1280
WARRANTY: ane yeor parts and labor, thraugh TRW, carry-in
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: toll-free number, M–F 8–5
OTHER SUPPORT: fox
Reader service no. 662

Wyse PC286 Model 2116-01
Wyse Technolagy
3471 First St.
San Jose, CA 95134
800/438-9973
LIST PRICE: Model 2116-01 with 1MB RAM, 1.2MB flappy drive, one serial and one parallel port, flappy/hord disk controller, 102-key keybaard, DOS 3.3, GW BASIC 3.2, disk-caching saftwore $2699; Model 2116-02 with 2MB RAM $3199; Madel 2116-40 with 40MB hard disk $3399
ACCESSORIES: 1.44MB 3½-inch floppy drive $219, VGA odopter $399, 12-inch VGA calar monitar $669, 1MB expansian RAM $599, Micrasaft OS/2 1.0 $325, Xenix 286 $595
WARRANTY: one year limited
EXTENDED WARRANTY: ovailable
TECHNICAL SUPPORT: no toll-free number, M–F 8–5
OTHER SUPPORT: BBS
Reader service no. 663

80386SX SYSTEMS

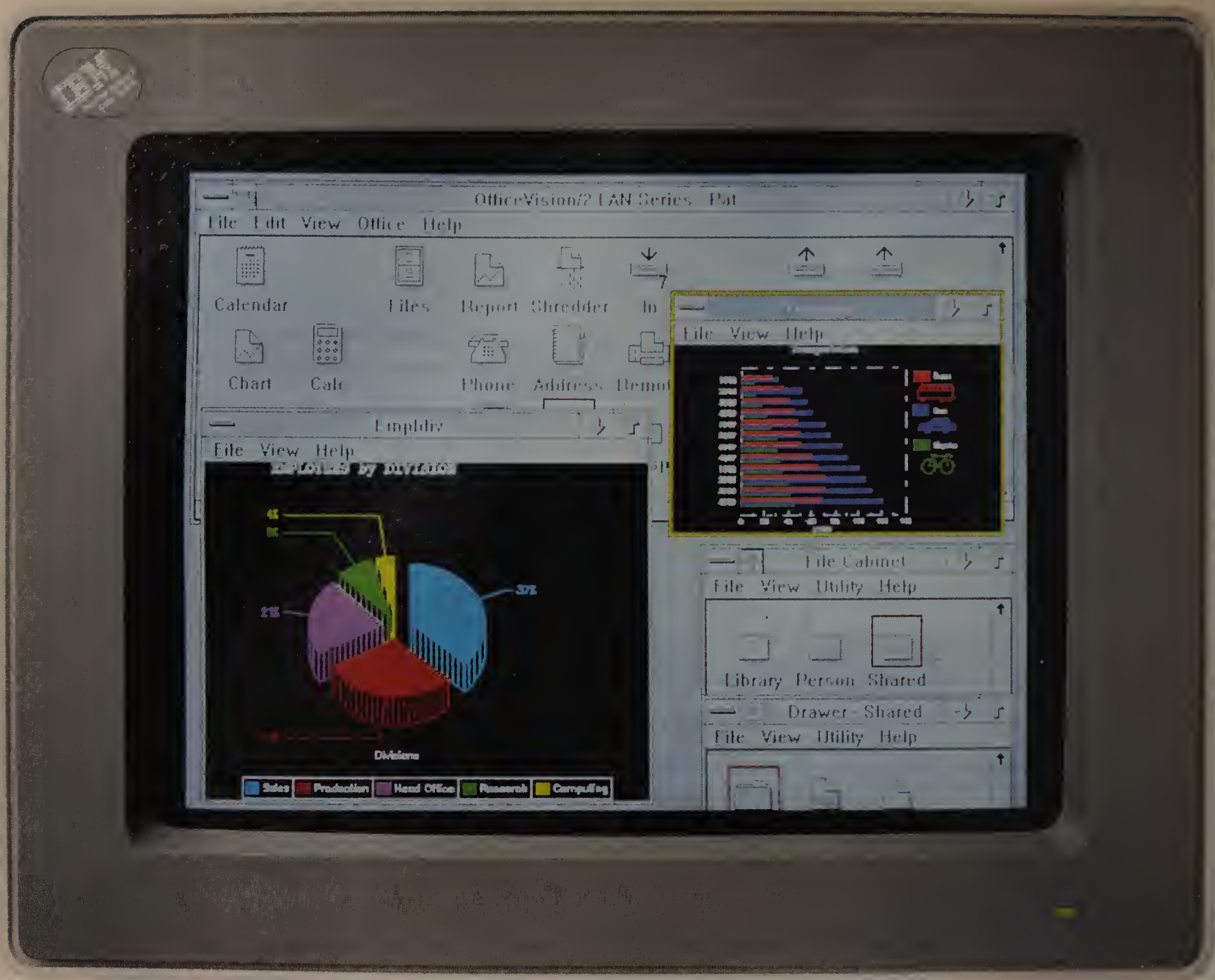
ALR FlexCache SX386Z
Advanced Logic Reseorch, Inc.
9401 Jeronima
Irvine, CA 92718
800/444-4257, 800/443-4226 Canada
LIST PRICE: Model 1 with 512K RAM, 16K cache RAM, 1.44MB 3½-inch floppy drive, one serial and one parallel part, flappy/hard disk cantroller, 101-key keyboard $1795; Model 10 with 1MB RAM, VGA adopter, Super PC-Kwik $2699; Madel 40 with 40MB hord disk and controller $4199
ACCESSORIES: 1MB RAM expansion board $500, VGA monitor $499, 80387-16 copracessor $555, MS-DOS 4.10 ond GW BASIC $139
WARRANTY: ane year limited an system, three yeors on pracessor baard
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: na toll-free number, M–F 8 a.m.–10 p.m.
OTHER SUPPORT: fax M–F 8–5
Reader service no. 664

Club AT 316SX
Club American Technalogies, Inc.
3401 W. Warren Ave.
Fremont, CA 94539
415/683-6600
LIST PRICE: with 1MB RAM, 1.2MB 5¼-inch flappy drive, one serial part and ane parallel part, floppy/hard disk cantroller, 101-key keybaard $1595; with 2MB RAM $1859; with 1MB RAM, VGA adapter ond monitor $2300; with 2MB RAM, VGA odapter and monitor $2568
ACCESSORIES: unpopulated 16-bit RAM expansion baard $125; 1MB exponsion RAM $324; 39ms 40MB hard disk $429, 28ms 40MB hard disk $521, 71MB hard disk $611, 158MB ESDI hard disk and contraller $1500, 338MB hard disk ond controller $2300, 651MB hard disk and controller $4450; 2400-bps internal modem $170; DOS 3.3 ond GW BASIC $90
WARRANTY: ane year parts and labar
EXTENDED WARRANTY: on-site service contract available
TECHNICAL SUPPORT: no tall-free number, M–F 7–5
OTHER SUPPORT: none
Reader service no. 665

Everex Step 386is
Everex Computer Systems Division
48504 Koto Rd.
Fremant, CA 94538
800/356-4283
LIST PRICE: with 1MB RAM, 1.2MB 5¼-inch flappy drive, ane seriol port and one parallel part, floppy/hard disk contraller, 101-key keybaard, DOS 3.3, GW BASIC 3.2, QuickStep disk-caching softwore $2799; with 2MB RAM $3099; with 4MB RAM $3899
ACCESSORIES: 40MB hard disk $600, 80MB hord disk $900, 160MB ESDI hard disk $1755, 330MB ESDI hard disk $2999; 2MB RAM upgrade $1099; VGA adopter $299; VGA colar monitor $499, NEC MultiSync monitor $799; 80387-16 coprocessor $695; internol 2400-bps madem $249
WARRANTY: ane year parts and labar, an-site
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: no tall-free number, M–F 8–5
OTHER SUPPORT: BBS
Reader service no. 666

NCR PC916SX
NCR Corp.
Computer Praducts Divisian
1601 S. Main St. PCD-1
Dayton, OH 45479
513/445-7487
LIST PRICE: with 1MB RAM, 1.44MB 3½-inch flappy drive, one seriol port, ane porollel part, floppy/hard disk cantraller, VGA adapter, DOS 3.3 $3395; with 28ms 44MB drive $4995
ACCESSORIES: 101-key keyboard $150, 116-key keybaord $220; 14-inch VGA calor monitor $699; 28ms 44MB hard disk $1570, 28ms 70MB hard disk $2570; 28ms 115MB hard disk $3670; 60MB streoming tape bockup unit $1995; 2MB RAM $1495, 4MB RAM $2895; 80387-16 coprocessor $795
WARRANTY: ane year parts and lobor, carry-in
EXTENDED WARRANTY: available
TECHNICAL SUPPORT: thraugh dealers anly
OTHER SUPPORT: BBS
Reader service no. 667

Promises made.



IBM's first SAA application: IBM OfficeVision.

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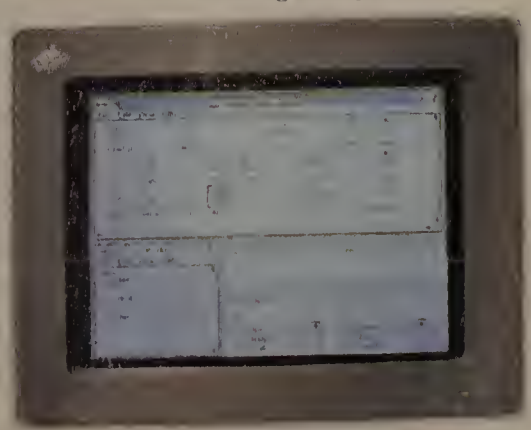
In the middle of an OfficeVision screen, you'll be able to "snap-in" familiar PC applications like Lotus 1-2-3® or Microsoft Excel.® At the same time, you can run larger business applications on host computers, get files from a mainframe, crunch numbers on a midrange and send a report on your local area network.

You'll also be able to swap information right on your screen—for example, paste a graph from a spreadsheet into a memo. Icons and mouse clicks make it very simple.

What's more, OfficeVision will protect your previous investments. It not only accommodates your DOS and nonprogrammable terminals, it extends their power, and it will work with existing office applications like IBM PROFS.™

On a PC network.

On a midrange computer.



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The question is, when should *you* embrace SAA? With applications like IBM OfficeVision, companies who adopt SAA will enjoy a clear advantage over those who don't. So the time to start planning is now.

To learn more about SAA, OfficeVision and your future, call your IBM Marketing Representative today.

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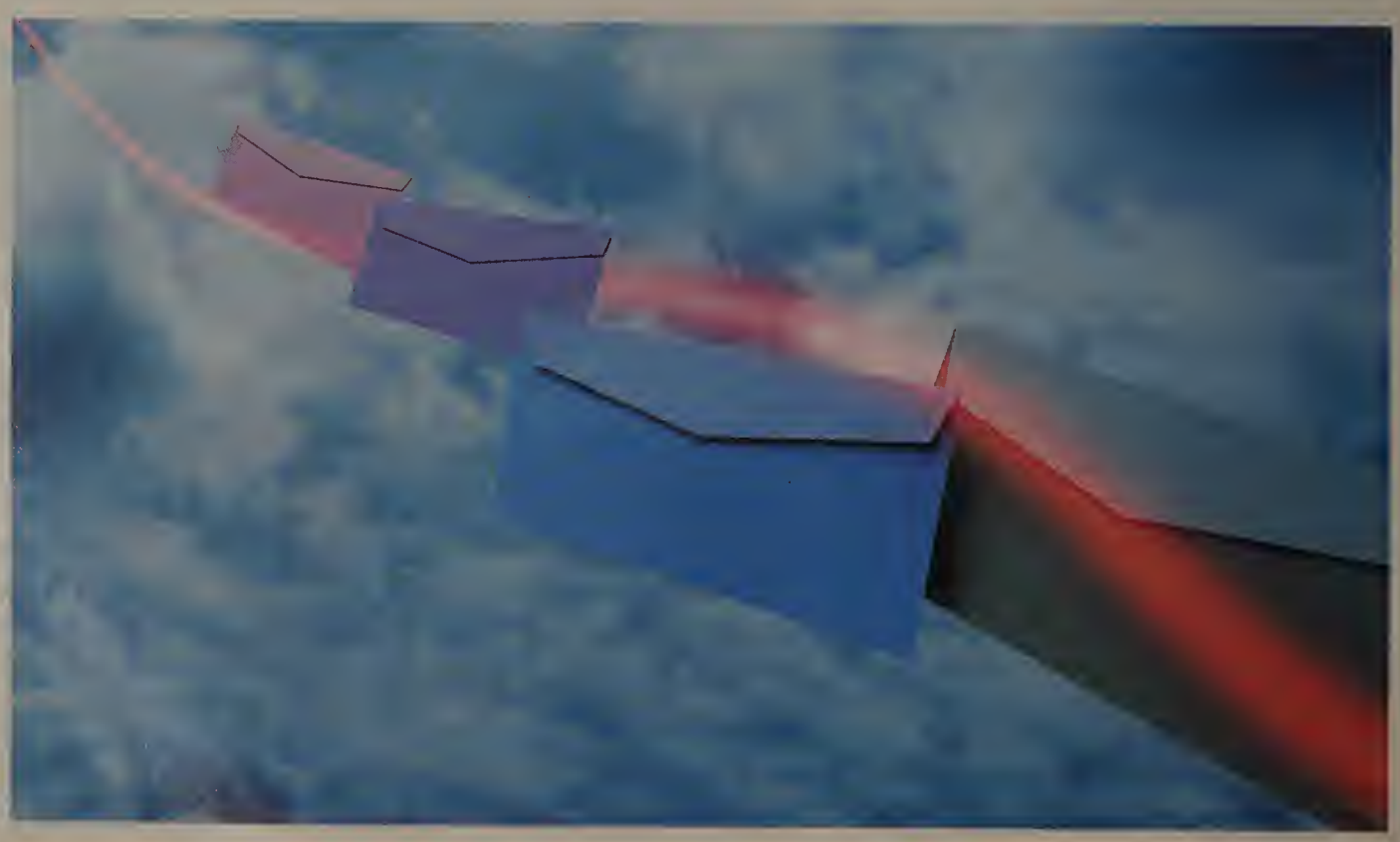
LAN E-Mail Delivers the Goods

Today's network E-mail programs are easier to use and learn—

and that can mean the difference between efficient messaging and frustrated users.



DAVID BISHOP

Robert Lauriston

Electronic mail packages for LANs are evolving quickly. Since *PC World*'s last LAN E-mail roundup ("LAN E-Mail: Power to the Work Group," *PCW*, November 1988), prices have dropped, and the range of messaging features and remote links has expanded.

The competition is intense. Groupware packages such as *Higgins* and *WordPerfect Office* have upped the ante by adding scheduling and project planning to LAN E-mail chores (see "Groupware: E-Mail Meets Scheduling," *PCW*, July 1989). To add further pressure, LAN operating system vendors are now selling highly competitive proprietary E-mail options (see the sidebar "Proprietary E-Mail Alternatives"). As a result,

the third-party products reviewed here play to the large *NetWare* marketplace. Novell offers Action Technologies' MHS (Message Handling Service) free to *NetWare* users. However, this message-passing back end can't be used for E-mail without a third-party front end.

To get ahead in this crowd, a third-party E-mail package must dish up an interface that's easy to learn and use, while offering top messaging features and connectivity. Three of the five programs reviewed here deliver the goods. cc:Mail's *cc:Mail 3.03*, DaVinci Systems' *DaVinci eMail for DOS 1.0*, and Consumer Software's *The Network Courier 2.0* all offer better E-mail features than groupware does—and usually at a lower price. Offices with complicated scheduling may prefer groupware, but most LANs will be better off with straight E-mail.

The other two programs reviewed, Enable Software's *Higgins Mail 2.2* and Transend Corporation's *Transend PC Complete 4.1*, aren't recommended for most users, largely because of their intractable interfaces. All the programs—except *Transend*, which requires *NetWare*—are compatible with all NetBIOS LANs.

Crucial Tools

Because everyone from novices to power users must tie in to the E-mail loop, an intuitive interface is essential. The top three packages—*DaVinci*, *Network Courier*, and *cc:Mail*—shorten the learning curve with competent help systems and welcoming interfaces. However, with all the programs save *DaVinci*, routine tasks often require tedious menu hopping.

Messaging features are fairly similar in all five programs, with tasks patterned on standard memo and postal procedures. There are in-boxes and out-boxes, and you can attach formatted files—including graphics and program files—to outbound messages. You can send copies to individuals or distribute mail according to lists created by you or the LAN administrator. Return receipts let you know your message has been read, and priority mail is flagged for immediate attention. You can also forward and reply directly to mail.

Greater disparities exist in mail management. Only three of the programs let you save files in subject folders, a handy organizational scheme that keeps your in-box manageable. And only two include bulletin boards that provide limited, on-line conferencing. Some programs let you select and display sets of messages grouped by date, sender, or subject, and some let you sort on labels so messages display in a certain order.

The programs' text editors are all fairly crude, but there are differences. For example, some lack block operations. All provide word wrap, but only *DaVinci* and *Transend* retain both hard and soft returns so paragraphs don't merge when revised. All import ASCII files, however, so you can use an external word processor.

If you can't stand being out of touch for even a moment, you can call upon memory-resident options. Except for *Higgins*, the E-mail programs pop up over any application, allowing you to read or send mail on the spot. And except for *Transend*, the programs include smaller TSRs that flash a message or beep when mail arrives.

For some users, connection to the outside world is all-important. Each of the vendors sells options that let remote modem users swap mail with LAN users, and vice versa, via a dedicated gateway PC. The same gateway also supports direct and remote two-way links to other LANs running the same package. If the E-mail program is MHS compatible, you can exchange mail with other LANs running MHS-based E-mail. You can also buy gateway options to on-line services like EasyLink, Telemail, and MCI Mail, and mainframe E-mail systems such as IBM's PROFS. You can even buy a fax gateway.

FEATURES EVALUATION

Editing and Organization—The E-Mail Acid Test

Messaging features are fairly standardized among LAN E-mail packages, but the message management and text-editing categories reveal some crucial differences.

● Yes ○ No
◒ Deficient
▼ Limited only by available disk space

Messaging options	DaVinci	Network Courier	cc:Mail	Higgins Mail	Transend
Maximum file attachments	▼	100	20	26	▼
Pop-up alarm TSR (RAM used)	2K	12K	11K	3K	○
Messaging TSR (RAM used)	100K	78K	77K	○	172K
Unload TSRs from memory	○[1]	●	●	○	○
Carbon copies	●	●	●	●	●
Blind carbon copies	●	○	●	○	○
Return receipt	●	●	●	●	●
Private mail lists	●	●	●	●	●
Public mail lists	●	●	●	●	○
Priority classifications	●	●	○	●	●
Password by message	●	○	○	○	○
See message while replying	●	○	○	○	○
Phone message form	●	●[2]	○	●	○
Bulletin boards	○	●	●	○	○
Message management					
Stores mail in folders	○	●	●	○	●
Saves copies of outgoing mail	●	●	○	●	●
Saves drafts	●	○	○	●	●
Global processing of mail	●	●	◒[3]	○	●
Sorts by sender, subject, priority	○	●	○	○	○
Displays by					
sender	●	○	●	○	○
subject	●	○	●	◒[4]	○
date range	●	○	●	◒[4]	○
text	○	●	○	○	○
priority	●	○	○	○	○

Text editing	DaVinci	Network Courier	cc:Mail	Higgins Mail	Transend
Imports /exports ASCII files	●	●	●	◒[5]	●
Block move and delete	●	○	●	○	●
True word wrap[6]	●	○	○	○	●
Cuts and pastes from ASCII files	○	●	◒[7]	○	○
Search and replace	○	○	●	○	○
Set text attributes	○	○	●	○	○
Snapshot utility	○	○	●	○	○
Graphics utility	○	○	●	○	○
Connectivity					
Remote PC access	●[8]	○[8,9]	●[8]	●[8]	●[8]
InterLAN routing	●	●[8]	●[8]	●[8]	○
MHS compatibility	●	○	●[8]	○	●
Fax	●[10]	○	●[10]	●[8]	●[10]
On-line E-mail services					
EasyLink	●[10]	○	●[8]	○	○
Telemail	●[10]	○	●[8]	○	●[10]
Dialcom	○	○	○	○	●[11]
MCI Mail	●[10]	○[9]	●[10]	○	●[10]
Mainframe/mini gateways	●[10]	○[9]	●[8]	●[8]	●[10]

[1] Leaves 13K "dispatcher" resident.
[2] Free third-party utility available.
[3] You can globally tag attachments only when sending, not receiving.
[4] You must assign subject keyword manually on receiving end.
[5] Imports only.
[6] Distinguishes between hard and soft returns.
[7] You must input range of line numbers from undisplayed file.
[8] Extra-cost option.
[9] Not available at press time.
[10] Requires extra-cost, MHS-compatible third-party option.
[11] Via local modem; no group gateway.

However, gateway prices vary greatly. For example, *DaVinci*'s interLAN routing is free, and remote modem access costs $250 per user. Yet, a similar setup costs $495 plus $95 per user for *Network Courier*, $1295 plus $295 per user for *cc:Mail*, and $1595 plus $395 per user for *Higgins Mail*.

cc:Mail, *Network Courier*, and *Higgins* all provide custom gateway options. *DaVinci* and *Transend* lack them, but their MHS support lets you choose from a growing list of third-party, MHS-compatible gateways. These are often more difficult to administer than custom gateways, but you'll find more products to choose from, and prices are usually lower.

If connectivity is crucial, the safest bet is a package that provides both custom gateways and MHS. Today, only *cc:Mail* meets

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those requirements, but other vendors promise MHS options by the time you read this, and *DaVinci* will sell custom gateways by year's end.

DaVinci eMail for DOS 1.0

A character-based spin-off from DaVinci Systems' *DaVinci for Windows*, *DaVinci eMail for DOS* takes first place on the strength of its elegant, easy-to-use interface. At $295 for five users and $995 per server, it's also affordable. *DaVinci* is an excellent value, especially for Novell LANs, but its lack of message folders denies it a Best Buy.

A slick menu-driven utility makes installing *DaVinci* a snap. On *NetWare*, it even sets up mailboxes, creates address lists, and automatically updates *DaVinci* as new users join the net. All program functions are available in the 100K RAM-resident module.

DaVinci's interface is the best of the lot, clearly benefiting from its *Windows* heritage. It sports pulldown menus, optional mouse control, and keystroke shortcuts to bypass menus. For instance, to delete a file you simply highlight the file name and press <Ctrl>-D; unlike with *cc:Mail*, you don't have to slog through submenus to find key features. The excellent context-sensitive help provides hypertext-like cross-referencing.

EXECUTIVE SUMMARY

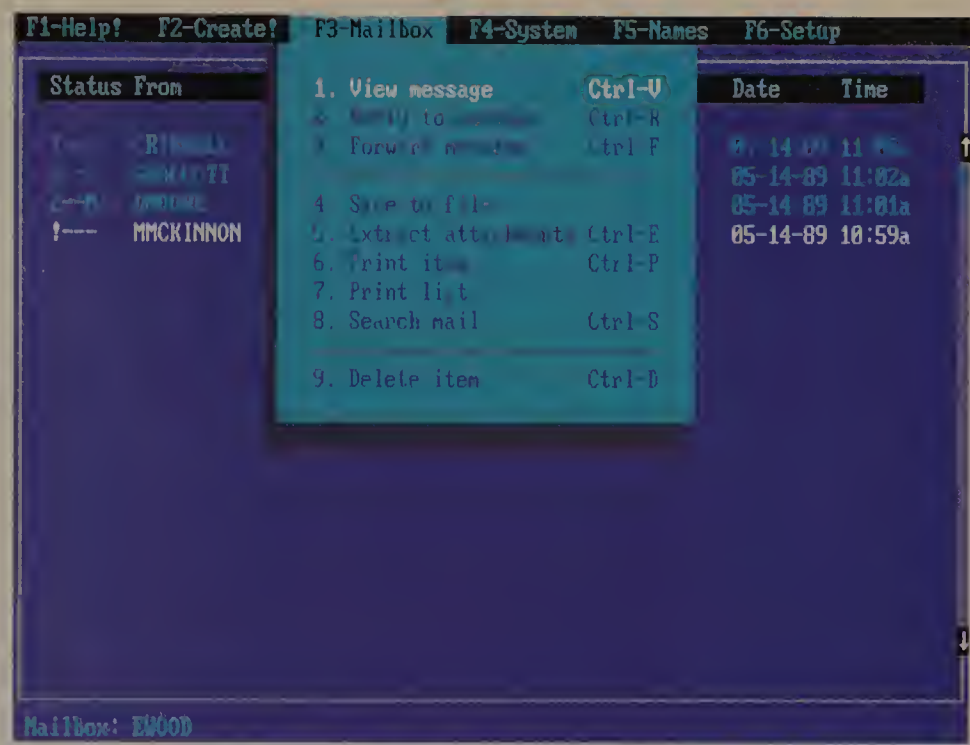
DaVinci eMail for DOS 1.0

LAN E-mail program

DaVinci's elegant design makes it easy to learn and use, and its installation and administration are streamlined for *NetWare*. Despite the lack of folders and bulletin boards, it's the best value in the roundup.

	POOR	FAIR	GOOD	EXCELLENT
Messaging options				●
Message management		●		
Text editing			●	
Connectivity			●	
Overall value				●

Reader service no. 672



DaVinci's hot-key shortcuts let you avoid the menu hopping that plagues most LAN E-mail programs.

Messaging features are superior. *DaVinci*'s the only program that lets you customize handling defaults such as priority and return receipt. Other singular extras include the ability to reply to a message while viewing it and to password-encrypt messages.

Mail management is a mixed bag. You can easily tag messages and attachments and delete or save them en masse. And you can select mail for display by sender, subject, date range, and handling options. However, *DaVinci* lacks folders and bulletin boards.

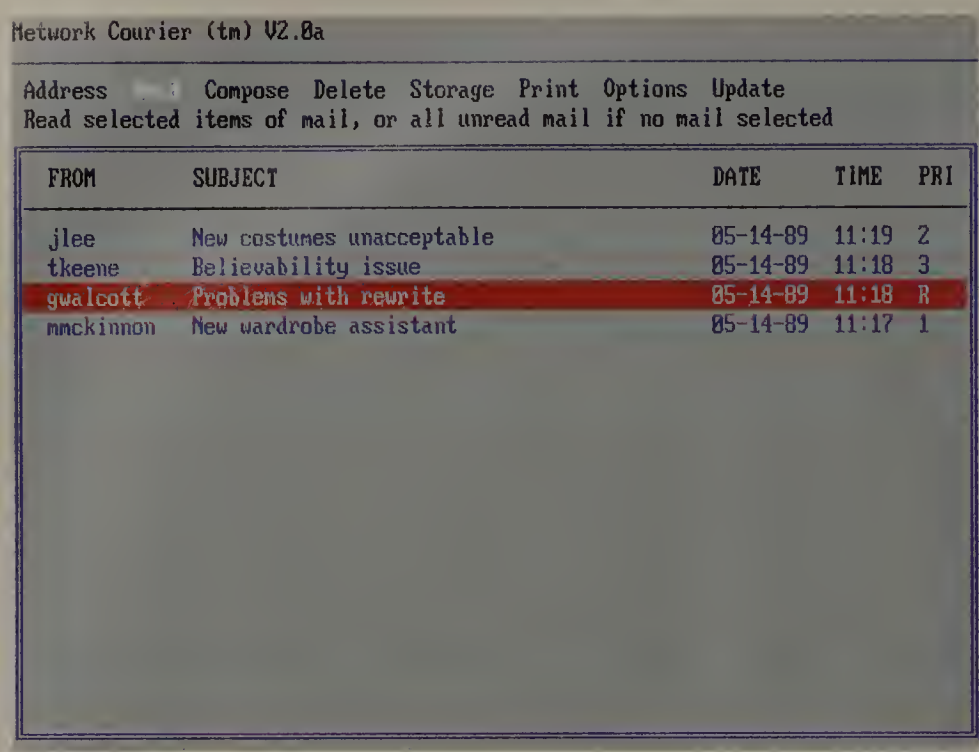
DaVinci's text editor is as good as they come in this roundup. You get true word wrap and block operations, and you can copy text between messages through a clipboard. Another plus—you can save message drafts for later editing.

DaVinci lacks custom gateways, but it provides MHS and interLAN routing at no extra charge. For more links, you can buy diverse third-party MHS gateways that DaVinci Systems resells and supports. Remote modem access costs $250 per user.

DaVinci sets new standards among E-mail packages for ease of use, and *NetWare* administrators will like its easy maintenance. If you can live without folders, go for it.

The Network Courier 2.0

The Network Courier delivers powerful features with button-down, corporate style. Version 2.0 brings the program up to speed with bulletin boards and user-defined mail-



The 1-2-3-style menus on The Network Courier's main panel provide quick access to key features. The R on the right side of the in-box indicates that a return receipt was delivered to the sender.

ing lists, and adds unique extras such as full-text message searches. At $295 for 6 users and $695 for 100, prices are competitive. It just misses besting *DaVinci* for top honors.

Network Courier's interface is much improved, making it easier to select menu items, such as address lists. The *1-2-3*-style command-line menus are intuitive and logical, and the context-sensitive help is thorough. Basic functions are only a keystroke away, and mail is quickly tagged with the <Space> bar for batch processing. However, less-common functions such as maintaining folders are buried under four menu levels.

The menu-driven installation program works well, but some tasks are not fully explained. You can read, compose, and send mail from within other applications with a 78K TSR, but you can't use folders.

Messaging features are abundant—you can choose from five priority levels and call on electronic phone message forms. But the text editor is weak. You can't perform block operations or save drafts.

Network Courier's comprehensive mail management provides nested folders (folders within folders), bulletin boards, and global processing of mail and attachments. It's the only program reviewed that lets you perform full-text searches on messages stored in folders. You can sort messages by sender, subject, or priority, but you can't restrict the display to a subset of mail.

At press time, *Network Courier 2.0* lacked connectivity options. However, version 1.0 offered exhaustive options, including remote dial-in, interLAN routing, and gateways to MCI Mail, PROFS, and other systems. Those options, plus MHS, should be available for *2.0* by the time you read this.

Network Courier is a sound choice. The text editor needs work, but the program's superb mix of features makes it a winner.

EXECUTIVE SUMMARY

The Network Courier 2.0

LAN E-mail program

Complete message features, superior mail management, and a reasonable price keep *The Network Courier* among the front-runners.

	POOR	FAIR	GOOD	EXCELLENT
Messaging options				●
Message management			●	
Text editing		●		
Connectivity			●	
Overall value			●	

Reader service no. 674

cc:Mail 3.03

Colorful *cc:Mail* has proved successful thanks to a mix of solid messaging features and intriguing extras such as a graphics editor and a screen snapshot utility. Version 3.03 should continue that success with its RAM-resident mode and expanded connectivity. Its pricing scheme ($695 for 25 users or $1290 per server) is reasonable for medium-size LANs but expensive for small and large networks. The program's keystroke-happy interface nudges it to third place in this roundup, but it's still a good deal.

You navigate *cc:Mail*'s flexible, pop-up menus with cursor keys or first-letter commands. Yet the menu hierarchy can be confusing, burying some key features in submenus. Basic tasks require numerous keystrokes; for example, to delete a message, you have to open it, close it, select Delete from a menu, and then confirm a prompt.

Some menu options are ambiguous—the difference between 'read inbox messages' and 'retrieve messages' is not immediately apparent. Still, the program is straightforward once you get the hang of it, and it provides context-sensitive help.

The installation utility isn't menu-driven, but it's easy enough for most. One plus for administrators: *cc:Mail* guards against data corruption with its own fault-tolerant routines. You can load a 77K messaging TSR, but it won't let you thumb through folders or use graphics.

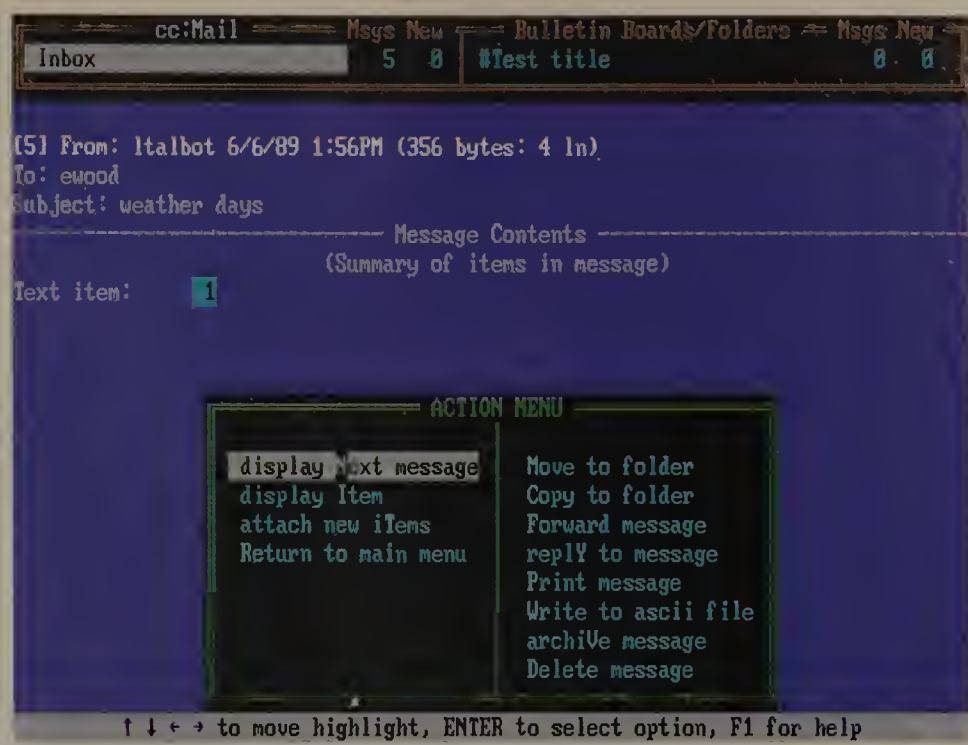
Although you can't send priority messages, *cc:Mail*'s messaging is otherwise superb, providing blind carbon copies and other extras. Mail management is top-notch: You get folders and bulletin boards, and you can search by sender, subject, and date range.

cc:Mail's editor skimps on certain basics but provides some nifty curios. You can't cut and paste between messages or even move a word at a time, but you get block operations and search and replace. Unlike its rivals, *cc:Mail* lets you add colors and shaded highlights to text.

More useful is the ability to take a screen snapshot, annotate it, and attach it to a message. This feature allows support staff to check out errant applications from their own desks. Another exotic extra: a simple graphics editor, complete with shapes, fills, and display text. It seems a bit out of place, but the company plans to use it as a fax viewer in a future release.

cc:Mail's connectivity options are the roundup's most comprehensive. Remote modem access costs $295 per user. Other links require the $1295 *cc:Mail Gateway*, which includes MHS support and interLAN routing. Custom gateways are available for EasyLink, Telemail, and PROFS.

cc:Mail's menu system cries out for hot keys. Yet the program's solid feature set, MHS compatibility, and screen snapshots make it an attractive buy.



cc:Mail's menus offer abundant E-mail options, but some important features are buried in submenus. Here a message appears with an attachment ("item") waiting to be opened.

EXECUTIVE SUMMARY

cc:Mail 3.03

LAN E-mail program

A wide range of features and connectivity options makes cc:Mail attractive. Despite a somewhat tedious interface, its built-in graphics and other extras make it a good buy.

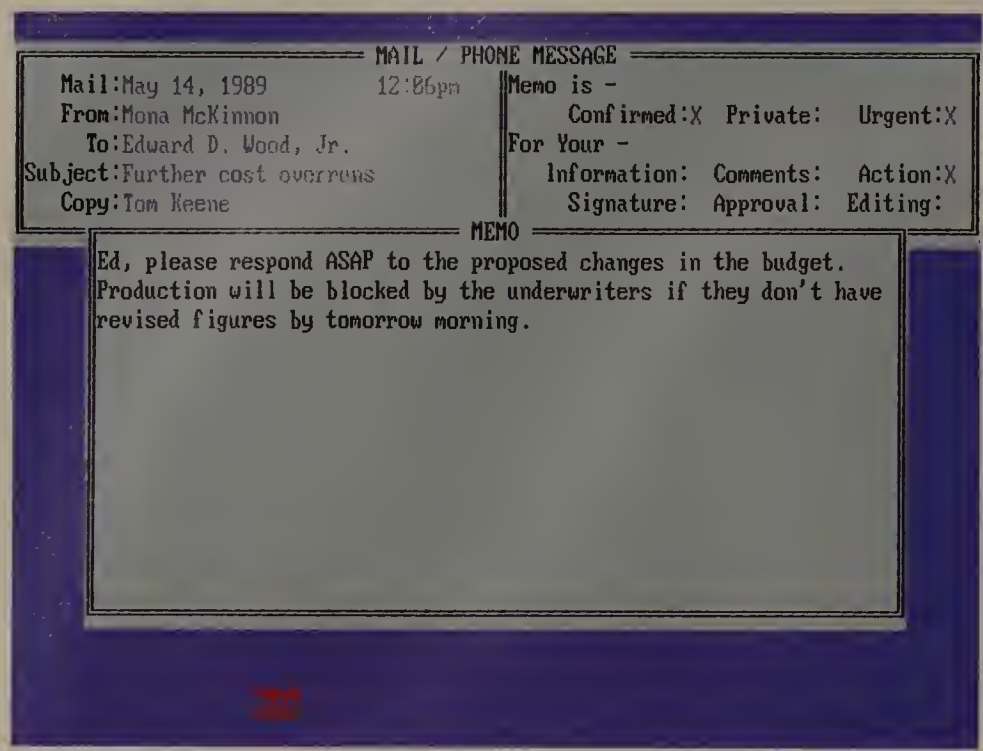
	POOR	FAIR	GOOD	EXCELLENT
Messaging options			●	
Message management			●	
Text editing			●	
Connectivity			●	
Overall value			●	

Reader service no. 671

Higgins Mail 2.2

A subset of the *Higgins* groupware package, *Higgins Mail* can't hold its own as a dedicated E-mail program. It's plagued by the same interface flaws as *Higgins*, yet it lacks the sophisticated features that make *Higgins* worthwhile. Despite a few clever touches, it's difficult to use, the text editor is weak, and it lacks a messaging TSR. At $495 per 20 users, it's costly for large LANs.

Installing *Higgins Mail* is easy, but the administrator's program is confusing, and you can't run it while the E-mail program is in use. The utility includes some *Higgins* options, such as a sort key, that don't work with *Higgins Mail*.



Some items on Higgins Mail's main menu are mystifying, and moving around is awkward. Message types on the upper right let you prompt the addressee to action.

Higgins Mail's poorly organized command-line menu system follows few standards and requires even more keystrokes than *cc:Mail.* You can't navigate using cursor keys, and menu titles are cryptic. To edit a field, such as the subject, you must drag through a separate menu. Worse, you're often forced to confirm defaults on three minor menus before you reach a basic function.

Higgins Mail's buggy help system is irritating. Sometimes it's context-sensitive, sometimes not. Sometimes it brings up a single, cryptic word; other times, nothing at all.

Higgins Mail's messaging features are complete, and some appealing novelties await you. You can send phone message forms and employ a second, "public" password that lets a proxy read any mail except that marked private by the sender. You not only can tag mail as urgent, you also can request a specific response, such as comments, action, signature, and editing.

However, the clumsy interface makes messaging cumbersome. For example, when you reply to a message, copies of any attachments you received are returned as well. Matters aren't helped by *Higgins Mail*'s limited text editor. It can't save messages as ASCII files, has no block operations or automatic reformatting, and limits you to 120 lines per message.

Message management is a bit better but doesn't include folders or bulletin boards. Instead, you select mail by date range and manually assigned keywords, using Boolean operators to refine the search.

Connectivity options are thorough but expensive. For interLAN routing and a foot up on other options, you must buy *Higgins Exchange* for $1595. You can then integrate modem users at $395 per remote PC. Other modules include a fax link and gateways to PROFS, SNADS, and *3+Mail.*

Higgins Mail adopts *Higgins'* bad habits without giving you the productivity payoff. If you need scheduling, consider *Higgins* but pass *Higgins Mail* by.

EXECUTIVE SUMMARY

Higgins Mail 2.2

LAN E-mail program

A stripped-down E-mail–only version of the *Higgins* groupware package, *Higgins Mail* can't keep up. It's weak on features and burdened with a clumsy interface.

	POOR	FAIR	GOOD	EXCELLENT
Messaging options			●	
Message management	●			
Text editing	●			
Connectivity			●	
Overall value	●			

Reader service no. 673

Transend PC Complete 4.1

Unlike its rivals, *Transend PC Complete* provides a single mail center for both LAN E-mail and local modem communications. But this innovative approach is undermined by an odd interface and a lack of central administration. The problem is, *Transend* isn't a true multiuser program but rather a single-user program you can link to other *Transend* nodes with MHS. At $229 per station, *Transend* is the most expensive program of the group. A LAN E-mail–only version costs $295 per five users, but its lack of key features makes it a poor choice.

Because it's not a LAN application, installing and administering *Transend* is a headache. You must install the program (and a serial number file) on each PC. You can load the entire program as a TSR, assuming you have a whopping 172K to spare.

Transend's eccentric function-key interface is cumbersome, with endless confirmation prompts and nonstandard commands. For example, <Enter> and <Escape> give way to <F1> and <F2>. Priority and return receipt options are hidden away in submenus, and on-line help is limited to a simple function-key map.

LAN messaging features are weak, lacking public mailing lists and bulletin boards. You can save mail to folders, but you can't sort or select. On the bright side, *Transend*'s editor offers block operations and true word wrap.

The centralization of LAN and modem messaging has its merits. You can mix LAN-based and external E-mail remote users on a single address list, so you don't have to switch between separate programs and mailing lists. As a dedicated E-mail program, *Transend*'s strength is its prefab scripts for swapping mail on Dialcom, HPDESK, MCI Mail, OnTyme, and Telemail. You can add other scripts with a flexible macro language. Communications features, however, are fairly

EXECUTIVE SUMMARY

Transend PC Complete 4.1
LAN E-mail program

Transend attempts to wed a single-user E-mail program with a communications program to create an integrated communications environment. But installation is tedious, the interface is exasperating, messaging features are limited, and the price is exorbitant.

	POOR	FAIR	GOOD	EXCELLENT
Messaging options	●			
Message management			●	
Text editing			●	
Connectivity			●	
Overall value	●			

Reader service no. 675

PROPRIETARY E-MAIL ALTERNATIVES

Originally, third-party LAN E-mail packages compensated for the incomplete E-mail utilities available from LAN OS vendors. Times have changed. With the notable exception of Novell, which no longer sells an E-mail utility, the major LAN OS vendors provide excellent, extra-cost E-mail options.

AT&T, Banyan, and 3Com offer their network users proprietary E-mail programs that match third-party programs on features and price. They all offer strong message-handling options, file attachment capabilities, public and private mailing lists, folders, and pop-up alarms. And they excel at connectivity—you don't have to dedicate a workstation as a gateway. Banyan and 3Com packages are also compatible with MHS.

Connectivity is the strong suit of AT&T's *PMX/Starmail* ($995 per server), which runs on *Starlan* LANs. It can swap mail with other *Starmail* LANs as well as with E-mail systems, including UNIX Mail, PROFS, and AT&T Mail. Unlike Banyan and 3Com products, *Starmail* can run as a TSR.

Banyan Mail ($995 per server) runs on *Banyan Vines* networks. LAN administrators can take advantage of *Vines'* StreetTalk name service data base for streamlining interLAN routing. You can easily track and update user accounts across a wide area network. Add the $1495 *PC Dial-In* to your network, and remote users get full network access.

3Com's *3+Open Mail* ($1190 per server), which runs on *3+Open*, allows DOS, OS/2, and Macintosh workstations to share a single mail server. Like *Banyan Mail*, *3+Open Mail* shares a name service with *3+Open* for easier administration and interLAN routing. It has superior mail management features, letting you sort or select by date, sender, subject, or full text search. *3+Remote* ($195 per PC, $1500 per server) provides remote access. —*R. L.*

limited. Emulations are confined to VT 100, and error-checking protocols to XMODEM and Kermit.

Third-party MHS connectivity products are available, but unlike DaVinci Systems, Transend Corporation does not sell or support them. Remote modem users can call in to the LAN, but each remote user needs a copy of MHS ($100) plus a copy of *Transend*.

Transend PC Complete is not a reasonable choice for exchanging LAN E-mail. Its only niche is tiny LANs where users are tired of switching between LAN E-mail and communications packages.

Easy Wins It

Because today's LAN E-mail packages have fairly similar feature sets, ease of use becomes premium, especially considering the increasing sophistication of groupware and proprietary competitors.

With this in mind, *DaVinci eMail for DOS* takes first place. *DaVinci*'s intuitive design, low cost, and built-in MHS set it a notch above the rest. *The Network Courier* and *cc:Mail* take a close second and third place, respectively. *Higgins Mail* and *Transend PC Complete* just don't measure up.

A LAN E-mail Best Buy has yet to arrive, but several packages have come a step closer. When one manages to combine an easy interface, top-notch mail management, and strong, affordable external links, a clear winner may emerge. ●

Robert Lauriston is a San Francisco–based computer consultant specializing in LAN installations and WordPerfect.

For more information about all products in this article, circle reader service no. 904.

WHERE TO BUY

cc:Mail 3.03
cc:Mail, Inc.
385 Sherman Ave.
Palo Alto, CA 94306
800/448-2500,
415/321-0430
LIST PRICE: 25 users $695, 125 users $1290
ACCESSORIES: OS/2 version $495; remate access 1–9 users $295 per remote user, 10–24 users $195, 25–99 users $150, 100 or more users $100; Gateway (includes MHS support and required for fallowing options) $1295; Import/Export API $995, PROFS $2200, EasyLink $695, Telemail $695
REQUIREMENTS: 320K, DOS 3.1 or later versian
TECHNICAL SUPPORT: 90 days free, then $200 per year; tall-free number, M–F 7–7
OTHER SUPPORT: E-mail, newsletter
Reader service no. 671

DaVinci eMail for DOS 1.0
DaVinci Systems
P.O. Box 5427
Raleigh, NC 27650
919/839-2000
LIST PRICE: 5 users $295, server $995
ACCESSORIES: single-user (remate) $150; single-user MHS (remate) $100; DaVinci far Windows $1145 per server, Windaws/DOS version $1495 per server; UNIX gateway $995; gateways far fax, MCI Mail, SNADS, All-in-1, and ather systems available for MHS via third parties
REQUIREMENTS: 384K, DOS 3.0 or later version, hard disk recommended; nan-NetWare users need MHS ($100 per server)
TECHNICAL SUPPORT: na tall-free number, M–F 8:30 a.m.–9 p.m.
OTHER SUPPORT: E-mail
Reader service no. 672

Higgins Mail 2.2
Enable Software/
Higgins Group
Narthway 10, Executive Park
Ballston Lake, NY 12019
800/888-0684,
518/877-8600
LIST PRICE: 20 users $495
ACCESSORIES: Higgins Remote $395 per user; Higgins Exchange (required for interLAN routing and follawing aptions) $1595; PROFS $995, Fax link $995 (requires fax baard), 3+Mail gateway $495, SNADS $5000 and up, API $995
REQUIREMENTS: 640K, hard disk, DOS 3.1 or later version
TECHNICAL SUPPORT: tall-free number, M–F 7–5
OTHER SUPPORT: user training courses
Reader service no. 673

The Network Courier 2.0
Consumers Software
73 Water St., 7th floor
Vancouver, BC
V6B 1A1 Canada
800/663-8935,
604/688-4548
LIST PRICE: 6 users $295, 100 users $695, 500 users $2495
ACCESSORIES: Windows/DOS upgrade $595; interLAN version (required for fallowing options) $995 (150 users); following options unavailable at press time: Madem Mail $495 per server, $95 per remote PC; MCI Mail $695; SNADS $2500 per server, $1000 per post office; PROFS $5000 per host, $1000 per post office
REQUIREMENTS: 256K, hard disk, DOS 3.1 or later versian
TECHNICAL SUPPORT: na toll-free number, M–F 9–5
OTHER SUPPORT: BBS for interLAN users
Reader service no. 674

Transend PC Complete 4.1
Transend Corp.
884 Portola Rd.
Portola Valley, CA 94025
415/851-3402
LIST PRICE: 1–9 users $229 per PC, 10–24 users $199 per PC, 25–99 users $185 per PC, 100–199 users $175 per PC, 200–499 users $165 per PC, 500 or more users $150 per PC; LAN E-mail–only version $295 for 5 users
ACCESSORIES: same third-party MHS optians as DaVinci, except remote modem access requires MHS ($100) plus copy of Transend at each remote site
REQUIREMENTS: 320K, Novell NetWare 2.0 or later version, MHS, DOS 2.0 or later version
TECHNICAL SUPPORT: no toll-free number, M–F 8–5
OTHER SUPPORT: E-mail
Reader service no. 675

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Circle 142 on reader service card

We Interrupt T War For This Im

To all those unlucky enough to be stuck smack in the middle of the current spreadsheet confusion, take heart.

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One that delivers even more performance than you have (ahem) been waiting for, but without demanding expensive new hardware or extensive retraining. And without abruptly cutting you off from any user in your company, even those on mainframes.

The name of the spreadsheet is SuperCalc® 5.

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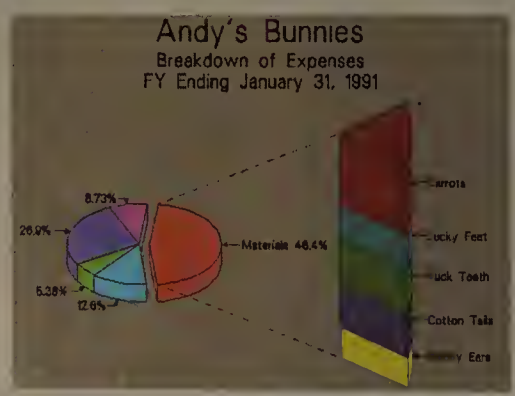
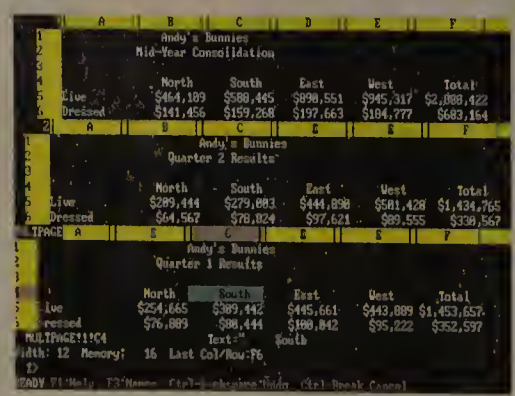
Let's begin at the end. Stand-alone quality graphic capabilities have been built in.



Present a state-of-the-art picture of your work.



Link just about everything in sight.

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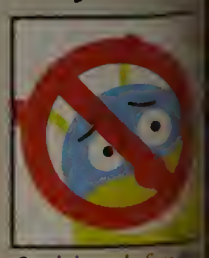

Catch bugs before come back to bite

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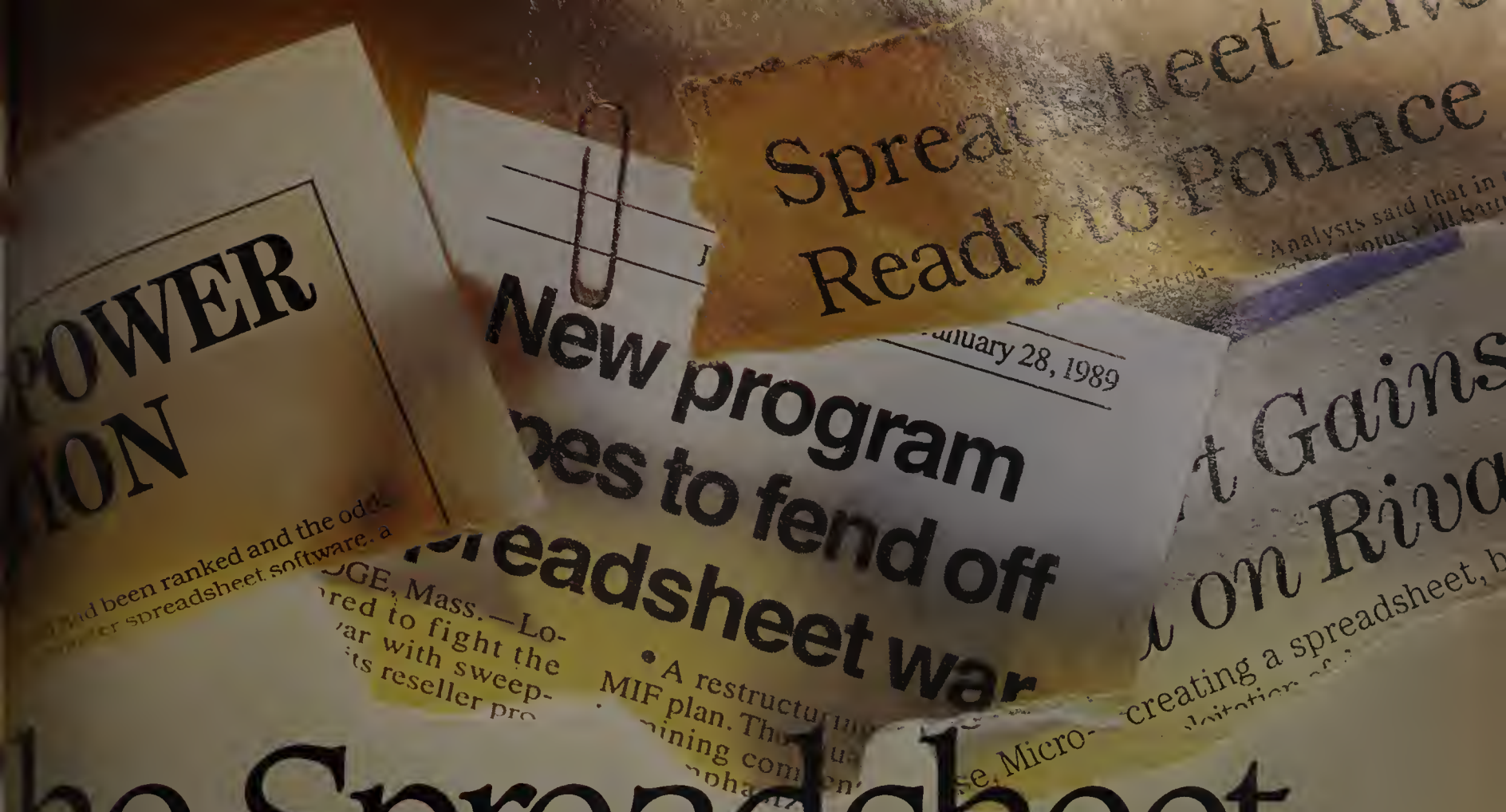

he Spreadsheet portant Update.

to be precise. Linking either in memory or on disk, either pages of the same spreadsheet or independent, either SuperCalc5's files or Lotus® 1-2-3®'s.

Andy's Bunnies
A Division of Hare Inc.
Income Statement
FY Ending January 31, 1991
Unaudited

	This Year	Last Year
Sales		
ve	$5,778,453	$4,089,672
Dressed	$1,444,775	$677,113
Sales Discounts	($434,990)	($479,124)
Rent-a-Rabbit Fees	$679,991	$324,557
	$7,468,229	$4,612,218
Sales		
Opening Inventory	$9,662,351	$5,676,712
Purchases	$109,814	$4,229,164
Freight In	$56,727	$43,242
	$9,828,892	$9,949,118
Ending Inventory	$7,334,110	$9,662,351
Cost of materials	$2,494,782	$286,767
Direct labor	$1,447,951	$1,677,243
Employee benefits	$289,590	$335,449
Ranch supplies	$679,444	$610,442
otal Cost of Sales	$4,911,767	$2,909,901
	$2,556,462	$1,702,31
g, general and admin expenses	$469,887	$490,774
Loss from operations	$2,086,575	$1,211,543
ome and expense:		
Interest income	$11,309	$9,765
Other income	$17,899	$15,666
Gain (loss) on sale of fixed assets	($379)	$0
	$28,829	$25,431
income taxes		
urrent income taxes	$1,043,287	$605,772
Deferred income taxes	$0	$0
	$1,043,287	$605,772
ar earnings (loss) for period	$1,043,287	$605,772

uce annual-report quality output everyday.

Which brings us to the "L" word. SuperCalc5 not only reads and writes Lotus® 1-2-3® files, it totally coexists with Lotus.

Letting you easily move 1-2-3 macros into SuperCalc5 and back again. Even toggling between menus is a snap for SuperCalc5.

But not for Excel.®

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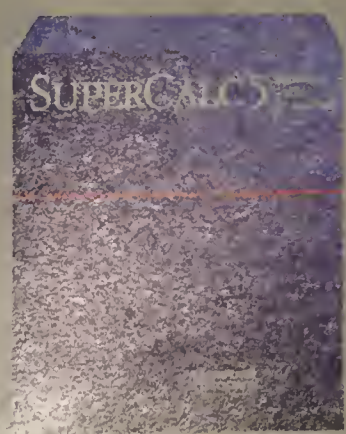

Which finally brings us to our admittedly biased outlook for the much touted spreadsheet war.

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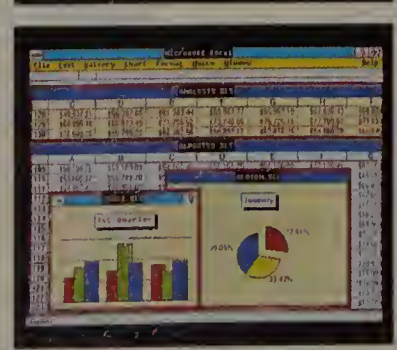

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PROGRAMMING

SPECIAL REPORT

A PC WORLD SUPPLEMENT ON PROGRAMMING AND APPLICATION DEVELOPMENT

EDITED BY SCOTT SPANBAUER

TERRY ALLEN

PROGRAMMING FOR NONPROGRAMMERS

WRITE A COMPLEX PROGRAM FROM SCRATCH? WITH THE HELP OF OBJECT-ORIENTED APPLICATION GENERATORS, IT MAY BE EASIER THAN YOU THINK.

ERIC BENDER

Your work is as unique as your fingerprints, but most business software is designed as "one size fits all." So although your beloved spreadsheet or word processor may seem as flexible as Roger Rabbit, sooner or later your reach will exceed its grasp.

Of course, you *could* write your own formfit applications; but for most of us, that's no more realistic than building our own car. And hiring a professional programmer is just too expensive. So we end up modifying a favorite program piecemeal with macro processors, utilities, and assorted add-ons.

But this year's crop of object-oriented application generators for programmers and nonprogrammers alike—*HyperPAD, Cause, Layout, SplashCard,* and others—may change all that.

These menu- and icon-driven tools build applications around self-contained objects. Objects essentially combine actions (such as printing) with data elements (such as records or files); they can be copied, modified, and used over and over again like building blocks (see "The Object Is Software Design" in the Languages Special Report, *PCW,* April 1989). So instead of typing lines of code, you snap objects together visually and get instant feedback. Most of these generators come with basic objects like buttons, menus, scroll bars, and dialog boxes, along with built-in flat-file, math, financial, and drawing capabilities.

The aim, of course, is instant gratification. Professional programmers can quickly build complex billing packages. In-house developers can slap together interactive training programs or data base front ends. Individual users can construct DOS shells, daily planners, or electronic Rolodexes. Some of the packages even feature relatively sophisticated (and easy to tap) animation functions, paving the way for interactive information publishing on the PC.

FROM THE MAC TO YOU

Much of the inspiration behind this boomlet came from Apple's *HyperCard.* Included free with every Macintosh, *HyperCard* lets nonprogrammers build applications, complete with sound and graphics, around on-screen cards that are linked in "stacks." *HyperCard* users have generated hundreds of thousands of stacks, solid proof that the masses will program if the right tools are at hand. Some PC packages surpass *HyperCard*'s talents and may match its popularity, especially if they're bundled with the hardware.

The first out of the gate was Brightbill-Roberts's *HyperPAD*, a text-mode *HyperCard* work-alike that's touted as a complete desktop environment (see the preview "A HyperCard for the PC," *PCW*, June 1989). *HyperPAD*, says company president Steve Brightbill, "is like the line from 'Saturday Night Live': It's a floor wax *and* a dessert topping!"

Like *HyperCard*, *HyperPAD* works with stacks, called pads, that are flat-file data bases of full-screen pages. To build a pad, you link buttons, scrolling fields, and other objects to another page, object, or program. You can, for example, quickly build a central pad with buttons that launch all your DOS applications. You can conjure up more complicated packages by delving into *HyperPAD*'s PADtalk script language. Moreover, the company supplies two dozen pads, ranging from a calculator to a powerful appointment tracker.

The flies in the ointment? *HyperPAD* can't do graphics, and you can't compile pads into a stand-alone application. Distributing your wares means buying copies of the *HyperPAD Reader* or paying a fat site-license fee.

Maxem's *Cause*, which shipped shortly after *HyperPAD*, is also a character-based program that can run on a dual floppy PC. However, *Cause* isn't centered on pads or stacks but on tasks. Although you work with menus and icons to create buttons, windows, menus, and dialog boxes, building an application involves defining resources (data files, windows, reports, and items the program will use) and connecting them to *Cause*'s built-in functions (file management, display, math, and others) via "steps." Some newcomers find the process a bit forbidding, but those with a little programming experience under their belts may love *Cause*.

They'll certainly appreciate *Cause*'s ability to swap files and recompiled applications with its Mac version,

RAY KANEMORI

Microsoft Corporation; Redmond, Washington

match fields from different files, and exploit multiple indexes. Although relational multifile joins are beyond *Cause*'s abilities, you could create a billing program, for instance, that worked with multiple files. Nascent publishers also note: For $100 more, you can compile and distribute unlimited numbers of stand-alone applications. Maxem naturally wants to act as publisher for these packages, which it dubs Effects.

Although professional developers represent a lucrative market, the potential profits to be reaped from the masses are irresistible. Matrix Software's *Layout*, which shipped in May 1988, is a case in point. *Layout* was originally positioned as an auxiliary tool for programmers, and it can generate code in *QuickBASIC*, *Turbo Pascal*, and other languages. But an upgrade shipping at press time targets everyday users. Company president Vince Garofalo says the idea isn't to create applications that sell 2 million copies but "to let 2 million people build their own applications."

Layout applications can incorporate graphics and sound and run as stand-alone packages. The software incorporates a script language and script recorder as well as hundreds of pages of on-line help and tutorials. Like its peers, *Layout* can be tapped for report writers, training programs, front ends, and more. Its central metaphor, however, is a flowchart. You string actions together using an extensive library of functions plus "black box" objects—canned routines that provide sophisticated data management, communications, and other functions—and *Layout* graphically maps your application's progress.

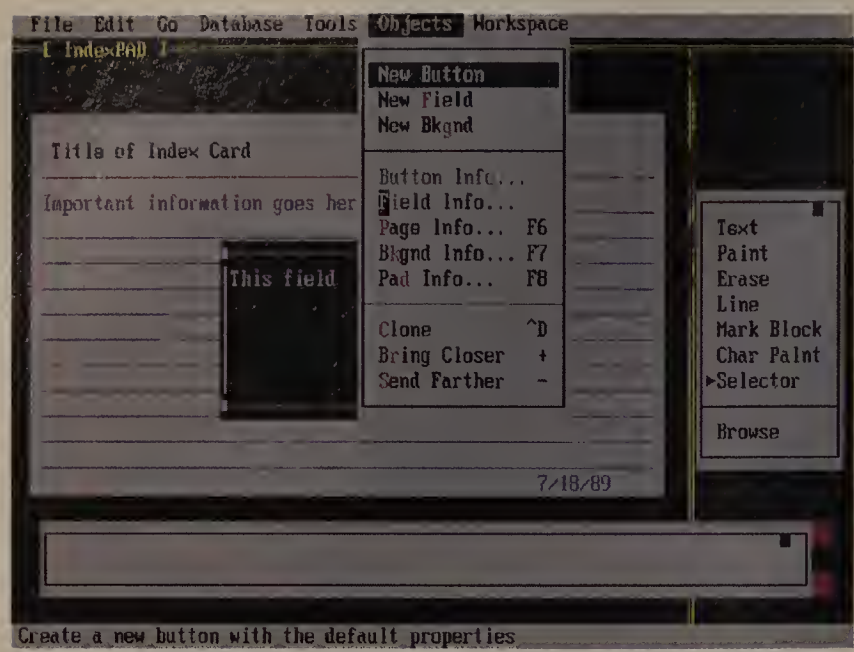
DAN BROWNING

Precision Inc.; Irving, Texas

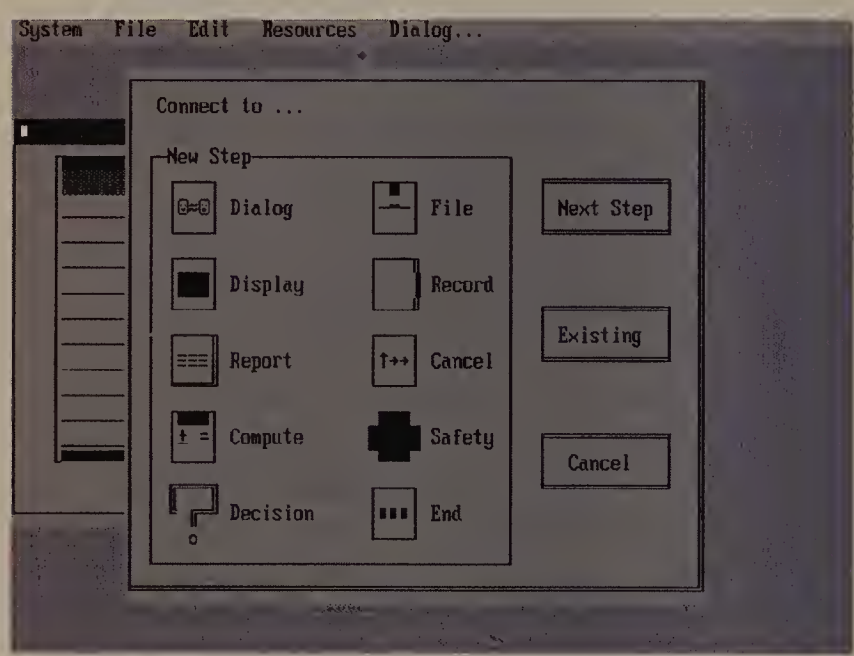
ALONG THE WINDOWS WAY

With its graphic interface and tight links between packages, *Windows* is a natural home for easy-to-use program generators. As you might expect, some of the offerings closely mimic *HyperCard*. These generators need a fast 80286 or 80386 system with lots of

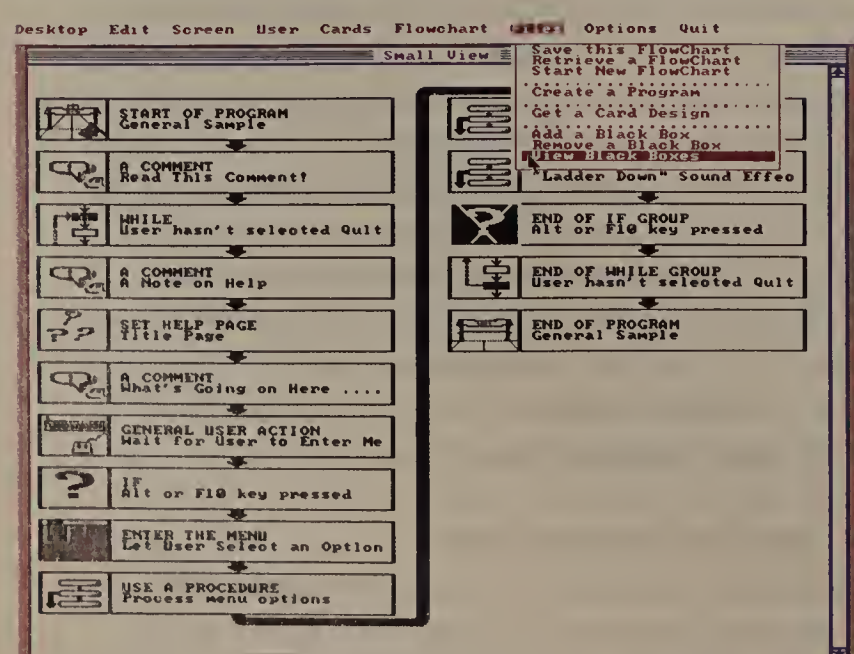
(top) Steve Saxton; (bottom) William McAvay



HyperPad's main motif is the pad—a data base of pages. Like its peers, Brightbill-Roberts's authoring system includes sample applications that you can modify.



Maxem's Cause lets you write your own packages by constructing windows, creating data fields and indexes, and conecting them all with "steps."



Matrix's Layout lets you assemble and view programs via a flowchart. Canned functions known as black boxes are key objects in an application.

memory, but they offer high-test graphics and, in some cases, animation and full relational powers.

One of the most ambitious entries is Spinnaker Software's *SplashCard*, a true *HyperCard* clone slated for release this fall. *SplashCard* duplicates *HyperCard*'s feel and functionality (including sound and graphics integration) and not only runs existing *HyperCard* stacks but generates Mac-compatible stacks. One notable bonus: *SplashCard*'s two-way Dynamic Data Exchange (DDE) support. You could easily link a *SplashCard* population-distribution map of the United States to an *Excel* worksheet holding the relevant data, and link that to an *Excel* chart; change the data anywhere, and every element updates instantly.

SplashCard will incorporate an extension of *HyperCard*'s HyperTalk language, but it may not offer learn-mode recording—a surprising omission that would force the program's nontechnical audience to turn to the script language far too often. A developers' version that creates stand-alone applications is slated for early 1990 release.

Not the last or least of this genre is a hush-hush program called *ToolBook* coming from Asymetrix, a Bellevue, Washington, firm started by Microsoft cofounder Paul Allen. A source close to the company indicates the package will provide a completely menu-driven, point-and-click, object-oriented development environment not unlike *SplashCard*. *ToolBook* uses a *HyperCard*-like page and book approach and will likely include animation, a draw module, the ability to incorporate graphics from a variety of sources, an English-like script language, and, best of all, script recording. For example, you could quickly draw a planet and its moon, literally drag the moon through a sample orbit, and save the result in a script; click a button, and the moon would take a spin all by itself. Such easily tapped powers—and the Microsoft connection—should win *ToolBook* widespread publicity and perhaps some heavyweight bundling deals with PC hardware makers.

Of course, not all the action is limited to standalone program generators. Internal programming languages that are the core of data managers, spreadsheets, and other off-the-shelf applications are also feeling the heat.

One of the first programs to adopt an object-oriented approach is Precision's *Superbase 4*, ported from the GEM environment. This forms-driven, fully relational data manager sports appealing features: query by example, DDE support, icons that control everything from playing back applications to scrolling, and the ability to integrate images into relational

forms. Perhaps just as important, says Precision president Dan Browning, *Superbase 4*'s BASIC-based programming language leverages the power of the forms. Commands like Open Form achieve results that would otherwise require 100 lines of code. "Before, you had to pay somebody $100 an hour to write the software for you," says Browning. "Now, with a little study, you can write this stuff yourself."

A SEPARATE NICHE?

With their visual appeal and point-and-shoot operation, these packages are fun to push around. Fundamental program building can be grasped quickly by anyone who's written a macro or a batch file. And with a little sweat, you can choreograph some fancy footwork for your applications. But don't be taken in by claims that you can "throw away the idea of ever writing code again!" Be prepared to sit down with pen and paper and plot out your program's logic and then grapple with a script language.

And, of course, you still need some serious motivation to create a full-blown application—after all, why mold your own accounting masterpiece if you can buy *DacEasy* and live with its limits?

"Users generally want ready-to-use applications," comments Bill Higgs, vice president for software research at InfoCorp. The new application generators "are implementing tools, not implemented solutions." While the underlying object-oriented architecture is powerful, Higgs feels the technology may go the route of expert systems and be incorporated into mainstream applications—à la *SuperBase 4*.

Broader solutions will come from emerging environments like OS/2 Presentation Manager and from the cross-application languages being drafted by Microsoft, Lotus, Ashton-Tate, and other major players. Such applicationwide languages will allow users not only to reshape a program's look and operation but to link it dynamically to other applications. You could, for example, write a simple program that would open a spreadsheet while a data manager was running and transfer and format accounts payable information for September.

VINCE GARAFOLO

Matrix Software Technology; Boston, Massachusetts

For this scheme to work, though, "applications as well as the operating system must understand objects," says Ray Kanemori, Microsoft's BASIC product manager. That leaves OS/2 and *Windows* in—and DOS out. A bigger hitch may be vendors' unwillingness to open their "common" language to all comers. Says Ed Belove, Lotus's vice president of corporate software development, "In three years, you'll see an incredible mishmash of different options." Microsoft, for example, has been evasive about publishing specs for its rumored Macro BASIC.

But while Macro BASIC and its kin remain obscure objects of desire, the demand for customizable software mounts. And millions of users have enjoyed a taste of programming. "In a sense, every spreadsheet offers programming for nonprogrammers," says Belove. "Some people will cross the line, others won't." Programs such as *HyperPAD* and *SplashCard* will swell the ranks of those who cross the line.

Eric Bender, PC World*'s East Coast editor, is a veteran nonprogrammer.*

For more information about all products in this article, circle reader service no. 902.

WHERE TO BUY

Cause
Maxem
7885 South River Pkwy.
Mesa, AZ 85284
800/336-6296,
602/491-2466
LIST PRICE: $495, developer's version $595
Reader service no. 651

HyperPAD
Brightbill-Roberts
120 E. Washington St.
#421
Syracuse, NY 13202
315/474-3400
LIST PRICE: $99.95
Reader service no. 652

Layout 2.0
Matrix Software Technology
One Massachusetts Technology Center
Harborside Dr.
Boston, MA 02128
617/567-0037
LIST PRICE: $149.95
Reader service no. 653

SplashCard
Spinnaker Software
One Kendall Square
Cambridge, MA 02139
617/494-1200
LIST PRICE: $99.95
Reader service no. 654

Superbase 4
Precision Inc.
8404 Sterling St., Ste. A
Irving, TX 75063
214/929-4888
LIST PRICE: $695
Reader service no. 655

TURBO PASCAL MEETS THE QUICK CHALLENGE

BORLAND'S ENTRY IS STILL THE PERFORMANCE LEADER, BUT MICROSOFT'S QUICK PASCAL 1.0 IS A SERIOUS—AND REMARKABLY COMPATIBLE—CONTENDER.

MICHAEL COVINGTON

QUICK PASCAL 1.0

PASCAL COMPILER

PROS: Object-oriented language extensions, multiple file editing, built-in symbolic debugger, compiles most Turbo Pascal 5.0–compatible source code

CONS: Can't compile to memory, can't create overlays

TURBO PASCAL 5.5

PASCAL COMPILER

PROS: Object-oriented language extensions permit early binding; fast compilation; built-in symbolic debugger; smart linker omits unused procedures

CONS: Can't control integrated environment with mouse, edits only one file at a time, hides program output at end of run

Object-oriented programming has come to Pascal. Not only does Borland International's new *Turbo Pascal 5.5* support it, but so does a serious competitor—Microsoft's just-debuted *Quick Pascal 1.0*.

Both new compilers support object-oriented programming (OOP), a way of attaching procedures to data types that helps organize complex programs (see "Pascal Gets Two Object Lessons," *PCW*, July 1989). OOP allows a program to label different object procedures—called *methods*—with the same name to handle different data types, a capability called *polymorphism*. For example, a graphics program can use one method to display a dot and another to display a circle. Both methods may be named Display, without confusing the compiler.

Further, one data type can inherit variables and methods from another data type and override inherited methods with new ones. (For example, a circle has everything a dot has, plus a radius, so the procedure that displays it must be different from the one that displays a dot.) Inheritance, along with polymorphism, contributes to the modularity and reusability of program code, increasing programmer productivity.

While *Quick Pascal*'s OOP syntax adheres closely to that of Apple's Object Pascal—the de facto OOP Pascal standard—*Turbo Pascal* implements objects differently. Whereas all objects are created at run time in *Quick Pascal*, *Turbo Pascal* objects can be created either at run time using the New keyword, or at compile time with a var declaration.

Any *Turbo Pascal* object can be *bound*, or attached, to its methods either at compile time or at run time. This compile-time, or early binding, capability gives Borland's compiler a distinct advantage over Microsoft's. If an object is both created and bound at compile time, OOP remains as efficient as conventional Pascal procedure calling; otherwise there's a performance penalty, which *Quick Pascal* users will have no way to avoid.

QUICK PASCAL: BANKING ON BEGINNERS

Microsoft has made a logical decision to support the sizable installed base of *Turbo Pascal* users. Apart from its OOP extensions, *Quick Pascal* is remarkably compatible with *Turbo Pascal 5.0*, cloning not only the language but also all the *units* (*Turbo Pascal* pro-

Turbo Pascal: Quicker Than Quick

Both Turbo Pascal 5.5 and Microsoft's Quick Pascal 1.0 offer OOP extensions. But Borland's veteran is faster and technically superior.

Compilation

B-tree

	seconds
Quick Pascal 1.0	6.0
Turba Pascal 5.5	6.6
Turbo Pascal 5.0	6.9

Chess

	seconds
Turbo Pascal 5.5	16.0
Quick Pascal 1.0	16.5
Turbo Pascal 5.0	16.8

Sort 1

	seconds
Turbo Pascal 5.0	3.2
Turba Pascal 5.5	3.2
Quick Pascal 1.0	3.3

Size of .EXE file

B-tree

	thousands of bytes
Turba Pascal 5.0	24,448
Turba Pascal 5.5	24,480
Quick Pascal 1.0	29,496

Chess

	thousands of bytes
Turbo Pascal 5.0	57,440
Turba Pascal 5.5	57,552
Quick Pascal 1.0	67,088

Sort 1

	thousands of bytes
Turba Pascal 5.0	12,736
Turba Pascal 5.5	12,800
Quick Pascal 1.0	18,960

Execution

B-tree make

	seconds
Turba Pascal 5.5	235.7
Turba Pascal 5.0	236.5
Quick Pascal 1.0	323.1

B-tree unsorted code

	seconds
Quick Pascal 1.0	18.6
Turba Pascal 5.5	18.6
Turba Pascal 5.0	36.0

Sort 1

	seconds
Quick Pascal 1.0	2.4
Turba Pascal 5.0	2.4
Turba Pascal 5.5	2.4

Chess

	seconds
Turba Pascal 5.5	54.5
Turba Pascal 5.0	54.6
Quick Pascal 1.0	71.3

Methodology
Benchmorks were performed on on 8-MHz IBM AT Model 339 with a 30MB hord disk ond o monochrome video odapter. Three programs, B-tree and Sort1 from the *Turbo Poscol 3.01* Database Toolbox ond Chess from the *3.0* GameWorks Toolbox, were used to compare *Turbo Poscol 5.0* and *5.5* and *Quick Poscol 1.0*.

Compilation
The compilation benchmarks compared the time it took *Turbo Poscol 5.0* and *5.5* and *Quick Poscol 1.0* to compile the test programs' ASCII source code files into executable (.EXE) files.

Size of .EXE file
The size of .EXE benchmark compared the size of the compiled executable files generated by *Turbo Poscol 5.0* and *5.5* and *Quick Poscol 1.0*.

Execution
The B-tree moke function was used to create a 1000-record data base with 12 fields. The B-tree unsorted code benchmark sent all 1000 records of randomly generated data to a null printer (a device that simulates an infinitely fast printer, one not slowed by paper or printhead movement). The Sort 1 benchmark read from disk the sample customer file provided with the Database Taolbox, sorted the data in memory, and then displayed the records on screen. The Chess benchmark timed how long the programs took to respond to a particular move in a specific situation, with each program's "performance level" set to five.

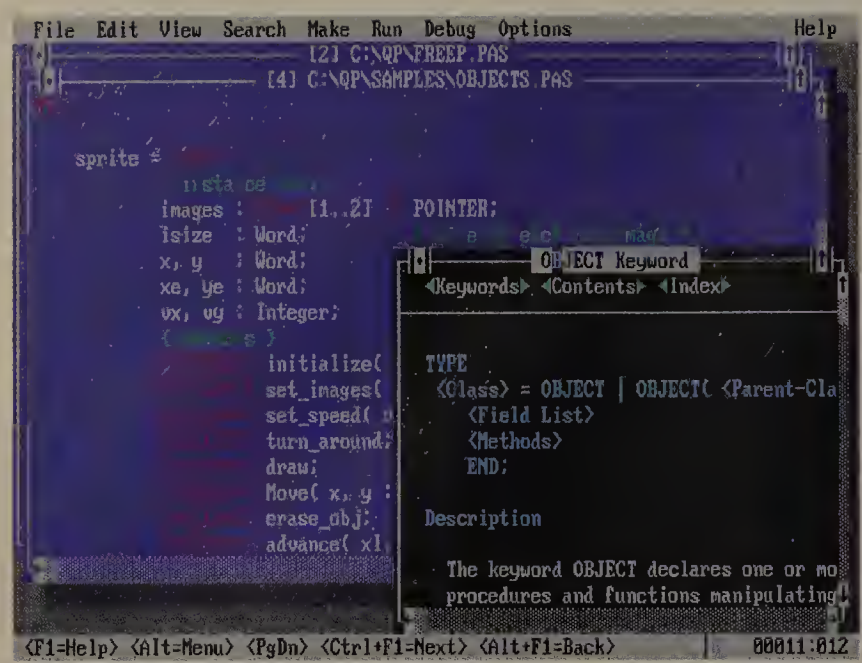
Doto based on tests designed and conducted by Notionol Software Testing Loborotories (NSTL). All rights reserved.

cedure libraries).

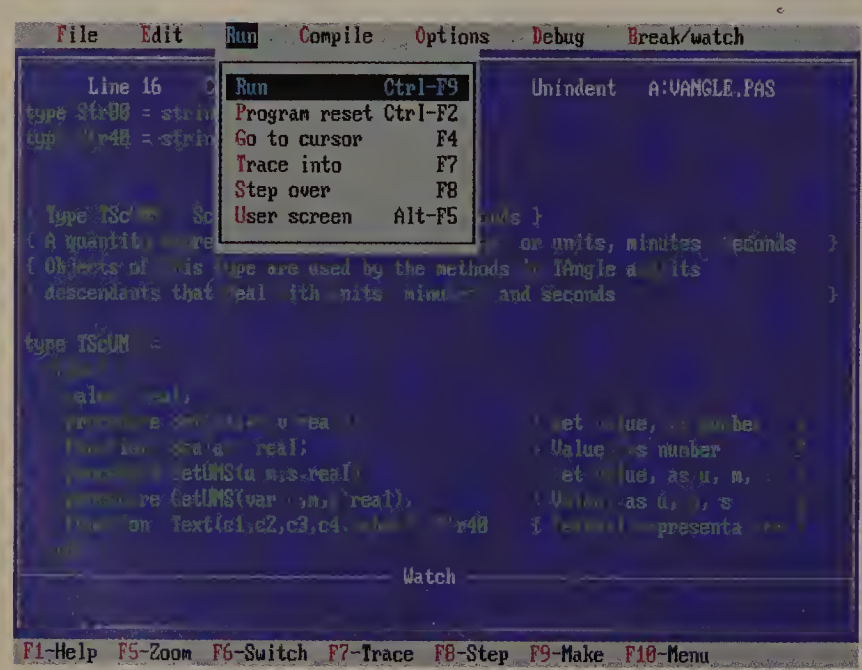
Quick Pascal treats one of the cloned units like a black sheep, however. Microsoft provides a *Graph* unit that's highly compatible with Borland's, but the documentation doesn't mention it—it's not even in the README file. Instead, Microsoft wants you to use *MSGraph*, a Pascal version of the *Microsoft C* graphics library.

MSGraph is the better of the two libraries, however. You can set VGA palettes even in text mode and access more information about the video adapter. *MSGraph* doesn't support the 8514/A or PC 3270 video mode—a minor irritation for programmers writing for those displays. A worse failing is *Quick Pascal*'s lack of overlay support: If your program doesn't fit into available RAM, tough luck. The lack of an overlay manager was one of the biggest gripes users had with *Turbo Pascal 4.0*, and Borland restored the feature in *5.0*.

Quick Pascal's editor lets you use a mouse and is easier to customize than *Turbo Pascal*'s, but it feels sluggish. It mimics *WordStar* by default and includes configuration files that allow it to emulate *Brief*, *EMACS*, and other popular editors. Its most attractive feature is the ability to edit multiple files in separate, cascading windows; this alone may persuade you to use *Quick Pascal* for the otherwise vexatious task of editing a unit and the main program at the same



Quick Pascal offers multifile editing and fast Pascal compiling.



Turbo Pascal 5.5 adds object-oriented programming to an already powerful compiler-editor-debugger.

time. And *Quick Pascal*'s editor, unlike *Turbo Pascal*'s, doesn't hide the output screen when a program finishes running, but politely waits for you to press a key.

TURBO PASCAL: STILL TOPS

Despite a serious challenge from *Quick Pascal*, several features make *Turbo Pascal* the superior product. *Turbo Pascal* normally compiles to memory rather than to a slower disk drive; *Quick Pascal* compiles only to disk. If you need more help tracking down program errors than is offered by *Turbo Pascal*'s built-in symbolic debugger, an updated $150 *Turbo Debugger* fully supports the new OOP extensions and is bundled with *Turbo Pascal* and *Turbo Assembler* in the $250 *Turbo Pascal Professional* package. While *Quick Pascal* does integrate a symbolic debugger, Microsoft's more powerful professional debugger, *CodeView*, can't debug *Quick Pascal* programs.

Only *Turbo Pascal* offers smart linking, which omits any procedures the program doesn't use from the compiled code before creating the final .EXE file. *Quick Pascal*'s .EXE files always include entire units, making the files bigger and more memory-intensive.

With pulldown menus and *WordStar* keystroke conventions, *Turbo Pascal*'s editor is nearly as easy to use as *Quick Pascal*'s. However, unlike *Quick Pascal*'s, it lacks mouse support and won't let you edit multiple files simultaneously.

STILL WAITING FOR...

Both compilers leave several things to be desired. For example, neither can generate *Windows* applications or programs that fully support a mouse.

Nonetheless, *Turbo Pascal*'s powerful array of features clearly earns it a Best Buy. Chief among the program's advantages is early binding capability, which boosts productivity by letting you attach methods at compile time. Add smart linking for smaller .EXE files, plus a powerful add-on debugger, and *Turbo Pascal* still stands as the Pascal compiler to beat.

Michael Covington researches artificial intelligence and programming language design at the University of Georgia.

WHERE TO BUY

Quick Pascal 1.0
Microsoft Corp.
16011 N.E. 36th Way
Box 97017
Redmond, WA 98073-9717
800/541-1261
LIST PRICE: $99
REQUIREMENTS: 512K, two disk drives (hard disk recommended), DOS 2.1 or later version
TECHNICAL SUPPORT: unlimited, no toll-free number, M–F 8–5
OTHER SUPPORT: none
Reader service no. 700

Turbo Pascal 5.5
Borland Int'l
1800 Green Hills Rd.
P.O. Box 660001
Scotts Valley, CA 95066
408/438-8400
LIST PRICE: $149.95; upgrade from version 5.0 $34.95, from version 4.0 $75
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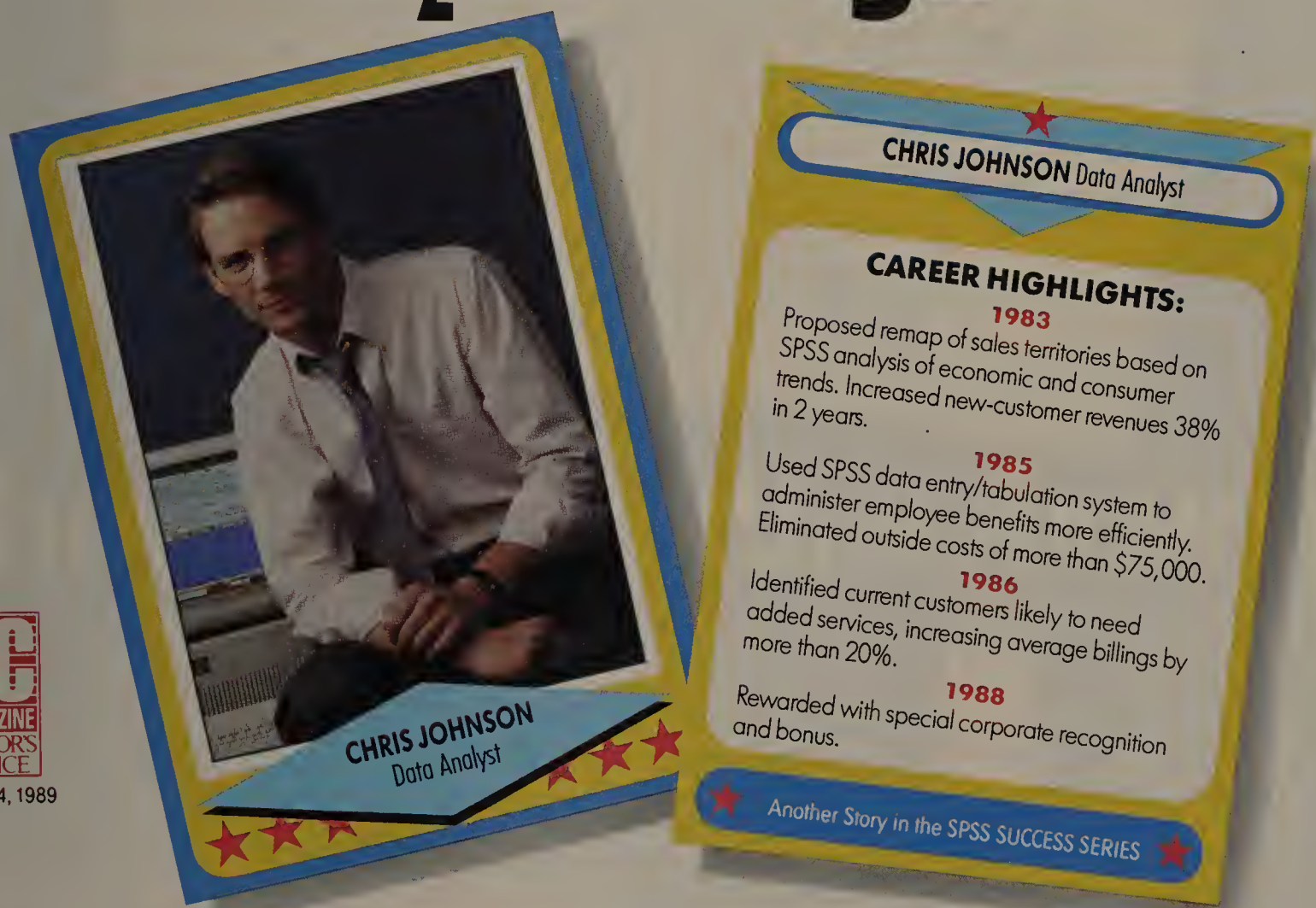

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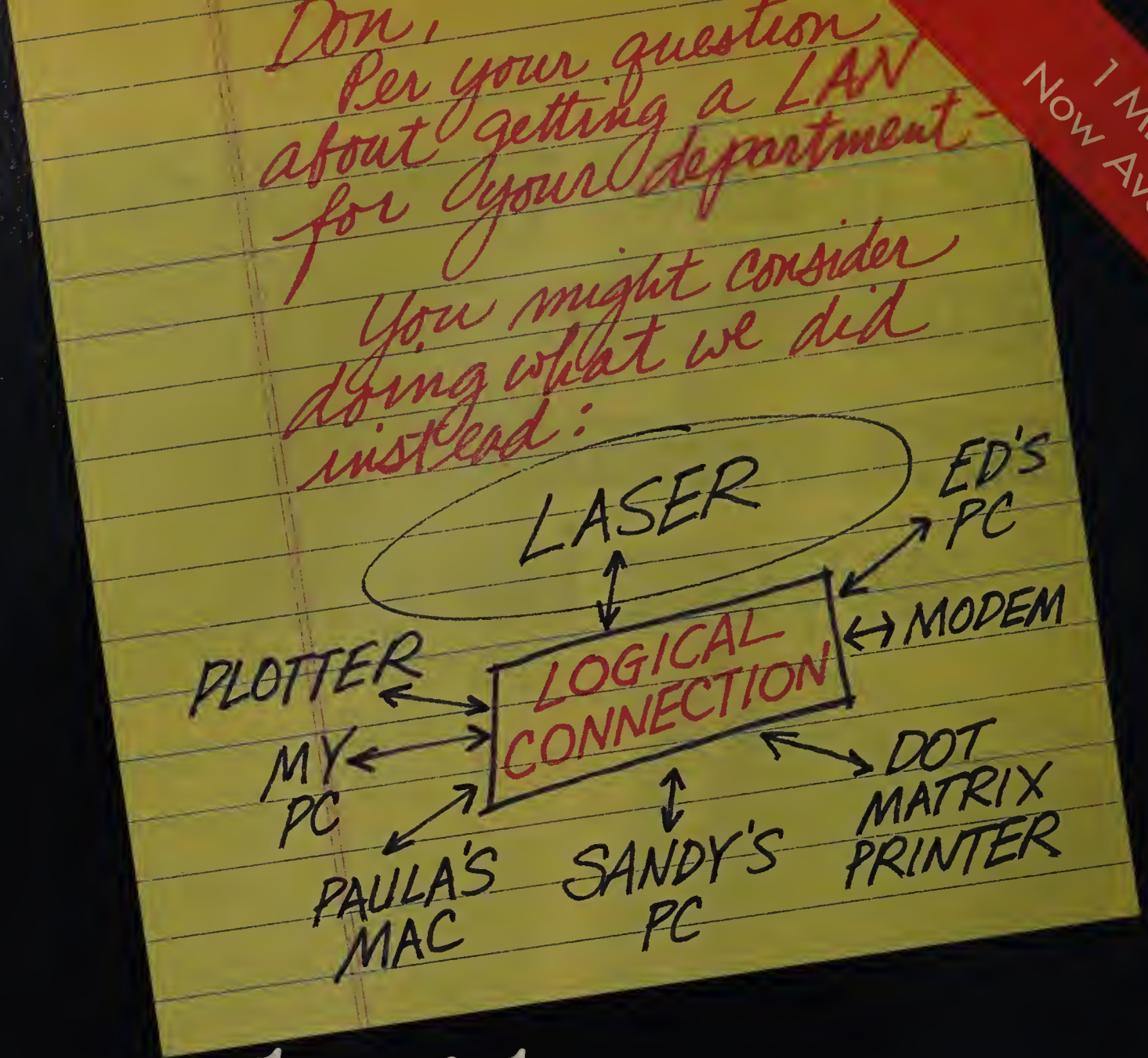

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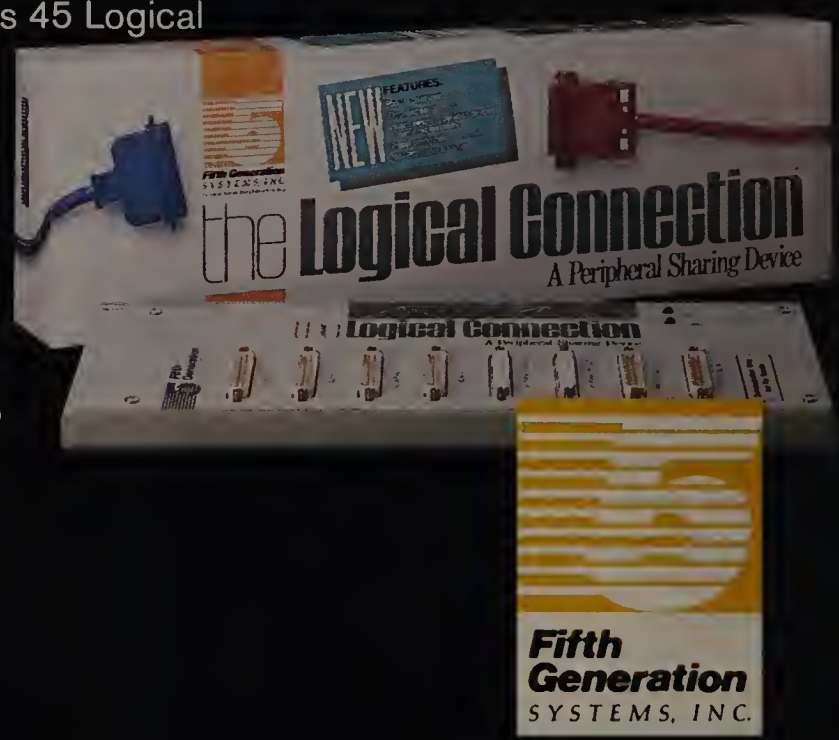

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HOW TO

A TURBO PASCAL OBJECT LESSON

CREATE A HANDY FILE-CONVERSION PROGRAM—

AND LEARN SOME USEFUL TURBO PASCAL TECHNIQUES ALONG THE WAY.

MARTY FRANTZ

WHAT YOU NEED: TURBO PASCAL 5.5

Although *WordStar 3.31* has gone the way of the passenger pigeon, files created with it—or with version 4.0—may still be valuable to you. The program WSTOASC.PAS, presented in **LISTING 1**, converts *WordStar*-formatted files into ASCII text that any word processor can digest. You can compile and run WSTOASC as is, but its main purpose is to illustrate the object-oriented programming capabilities of Borland's new *Turbo Pascal 5.5* (see "Turbo Pascal Meets the Quick Challenge" in this Special Report).

To create WSTOASC.PAS, type the listing in a text editor, load it into *Turbo Pascal 5.5*, and compile it with the Destination set to 'Disk' to create an .EXE file. To run WSTOASC.EXE at the DOS prompt, enter WSTOASC followed by a space and the name of the *WordStar* source file, another space, and the name of the ASCII destination file (a drive and/or path may, of course, prefix either file name). If the name of the destination file is the same as an existing file's, WSTOASC will overwrite the existing file, so be careful.

PROGRAMMING THE OOP WAY

The theory behind object-oriented programming (OOP) is that programs are easier to write, debug, and document when procedures and the variables they act on are combined into a new data type called an *object*. Once an object is created, it can be easily plugged into other programs, saving coding time. *Turbo Pascal 5.5* objects bear a striking resemblance to records, but they contain procedures and functions instead of fields. As with records, you must first declare object types, then create instances, or actual object variables, of those types. The WSTOASC program creates two object types, one called ASCII for ASCII files and one called WordStar for *WordStar* files. When the program runs, InFile is an *instance* of a *WordStar* object, and OutFile is an instance of an ASCII object.

In *Turbo Pascal 5.5*, the procedures and functions contained within an object are called *methods;* they define the kinds of messages the object can understand. Executing a method requires passing the method name, along with necessary parameters (such as the name of the file to open) to the object. For example, the command InFile.OpenFile('MYFILE.WS') would instruct the InFile object to open the file MYFILE.WS using the OpenFile method.

The real power of OOP lies in an object's ability to inherit much of its nature from another object. For example, the *WordStar* object is a descendant of the ASCII object and automatically possesses the OpenFile, CloseFile, GetAChar, and PutAChar methods. The coding is simplicity itself—WordStar = object (ASCII). But since *WordStar* files set the eighth (high) bit to 1 and contain soft hyphens, the *WordStar* object must use a different GetAChar method. This GetAChar method overrides the method inherited from the ASCII object; it turns the eighth bit from 1 to 0 and transforms soft hyphens into hard ones. In effect, GetAChar performs all of the actual file conversion.

```
program WSTOASC;
uses Dos;

type
  aStr = string[80];
  ASCII = object
    fp : text;
    function OpenFile(FileName : aStr) : boolean;
    function CreateFile(FileName : aStr) : boolean;
    function GetAChar : char;
    procedure PutAChar(C : char);
  end;
  WordStar = object(ASCII)
    function GetAChar : char;
  end;

var
  InFile : WordStar;
  OutFile : ASCII;

  function ASCII.OpenFile(FileName : aStr) : boolean;
  begin
    Assign(fp, FileName);
    {$I-}  Reset(fp);  {$I+}
    OpenFile := IOResult = 0;
  end; { Open }

  function ASCII.CreateFile(FileName : aStr) : boolean;
  begin
    Assign(fp, FileName);
    {$I-}  Rewrite(fp);  {$I+}
    CreateFile := IOResult = 0;
  end; { CreateFile }

  function ASCII.GetAChar : char;
  var C : char;
  begin
    Read(fp, C);
    GetAChar := C;
  end; { GetAChar }

  procedure ASCII.PutAChar(C : char );
  begin
    Write(fp, C);
  end; { PutAChar }

  function WordStar.GetAChar : char;
  var C : char;
  begin
    Read(fp, C);
    if Ord(C) <> $1e then GetAChar := Chr(Ord(C) and $7F) { zero 8th bit }
    else GetAChar := '-';  { make soft hyphen a real one }
  end; { GetAChar for WordStar }

  procedure Instructions;
  begin
    writeln('WSTOASC -- WordStar File Conversion Utility -- M. Franz 1989');
    writeln;
    writeln('WSTOASC wsfile ascfile');
    writeln('converts wsfile (WordStar format) to ascfile (ASCII format).');
  end; { Instructions }

begin { main program }
  if ParamCount < 2 then Instructions
  else begin
    if NOT InFile.OpenFile(ParamStr(1)) then begin
      writeln('Can''t open WordStar file');  Halt;
    end;
    if NOT OutFile.CreateFile(ParamStr(2)) then begin
      writeln('Can''t create ASCII file');  Halt;
    end;
    while not eof(InFile.fp) do
      OutFile.PutAChar(InFile.GetAChar);
    Close(InFile.fp); Close(OutFile.fp);
  end;
end. { WSTOASC }
```

LISTING 1: WSTOASC.PAS puts Turbo Pascal 5.5's new OOP syntax to work.

INSIDE THE CODE: STILL PASCAL

With object and variable declarations and procedure and function definitions out of the way, WSTOASC.PAS's main program block starts by testing the number of parameters (the source and destination file names) entered on the command line. If two exist, conversion proceeds; if not, the program calls the Instructions procedure and displays an appropriate error message.

Next, the program opens the input and output files (Assign statements in the ASCII.OpenFile and ASCII.CreateFile methods link them to InFile.fp and OutFile.fp, respectively) and copies the input file to the output file a character at a time. WordStar.GetAChar tests the incoming characters for soft hyphens (ASCII $le hexadecimal), which it replaces with hard hyphens ('-'). The Boolean AND operation with the hexadecimal number 7F (binary 01111111) converts the eighth bit to 0 and leaves the remaining seven bits unchanged. When WordStar.GetAChar reaches the end of the *WordStar* source file, both the source file and the destination file are closed.

CUSTOMIZING WSTOASC.PAS

Turbo Pascal 5.5's object-oriented nature makes maintaining and modifying programs easy. For example, if you want WSTOASC.PAS to strip out *WordStar*'s dot commands, you need only insert the necessary code into the WordStar.GetAChar method. Or, substitute different object types that transform other word processor file formats for the *WordStar* and ASCII types. Simply use the same method names—GetAChar and PutAChar—and leave the main program alone.

Marty Franz is a software engineer and freelance writer based in Kalamazoo, Michigan.

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JEFF WALDEN

WHAT YOU NEED: HYPERPAD

Like Apple's revolutionary *HyperCard*, Brightbill-Roberts' *HyperPAD* is an inexpensive, object-oriented application development tool that appeals to a broad range of users. If you need a quick custom DOS shell, an electronic phone book, or a billing system, *HyperPAD* is the tool to use (see the preview "A HyperCard for the PC," *PCW*, June 1989). This tutorial will show you how to set up a basic *HyperPAD* application and then attach scripts created with PADtalk (*HyperPAD*'s Pascal-like script language) to the application's control buttons.

HyperPAD applications, or *pads*, consist of *pages*, or screenfuls of information. Building a *HyperPAD* application is essentially the process of linking one page of information to another using a *button*. For example, you might choose to link pages in a pad sequentially from beginning to end. Or you could create a central page with buttons that lead to individual pages. This article describes a random access layout: Controls on each page can take you to any other page in the pad.

SOME HYPERPAD BACKGROUND

HyperPAD applications function on several levels: the pad level, which primarily consists of the main pad script; the background level, composed of elements shared by a group of pages (a pad may have more than one background page); the page level; and finally the button level. While you create many pad elements (such as the look of a page, and the size and visual attributes of buttons) using interactive menu commands, specific pad and button behavior must be defined in a PADtalk script.

Each script, whether for the pad level or for a button or *check box* (a variety of button), consists of *handlers*, which are similar to procedures in Pascal or SUBs in BASIC. Pad- and button-level handlers can call each other, just as standard programming language procedures do.

MAKING EFFICIENT LINKS

Turn most people loose with *HyperPAD*, and they'll start creating buttons, check boxes, and other control objects pell-mell. This presents few problems in small applications because the number of buttons (and the PADtalk scripts that make them work) is small. But as you add pages to an application, direct links from one page to another can proliferate. As an absurd example, if each page of a 9-page pad contained links to every other page, the pad would contain 72 buttons and therefore 72 scripts. Placing these direct-link buttons on the background page, which automatically makes them part of every page, reduces the number of scripts to nine. But the problem still remains: As your pad grows, you must add more buttons to the background.

One solution is to give each page a two-part name and let a combination of check boxes and buttons tell the pad how to find pages, much the way you move to a worksheet cell by specifying the row and column. For a 9-page pad, this would require only six buttons; by extension, eight buttons could address 16 pages with two-part names, and nine buttons could handle 27 pages using three-part names.

▶ PROGRAMMING THE PAD

The following sample pad creates the structure for a foreign language phrase book organized by language (Japanese, French, German) and topic (At Work, At Home, At School). It consists of 9 pages—one for each language/topic combination. Three buttons and three check boxes give the user access to any page of the phrase book, illustrating the programming technique just described.

Check box scripts call a pad-level handler named Pick_Language (see **FIGURE 1**) to reset the check box display on every page of the pad. Pad buttons read a value stored in a global variable by Pick_Language and use that information to find the correct page.

1. CREATE A NEW PAD

Starting at *HyperPAD*'s Home pad, press **<Alt>-<Space>** to display the menu and choose *New* from the File menu. Type a name for the new pad (such as LANGUAGE) and click on 'Ok' or press <Enter> to create the new pad; *HyperPAD* presents you with a blank page.

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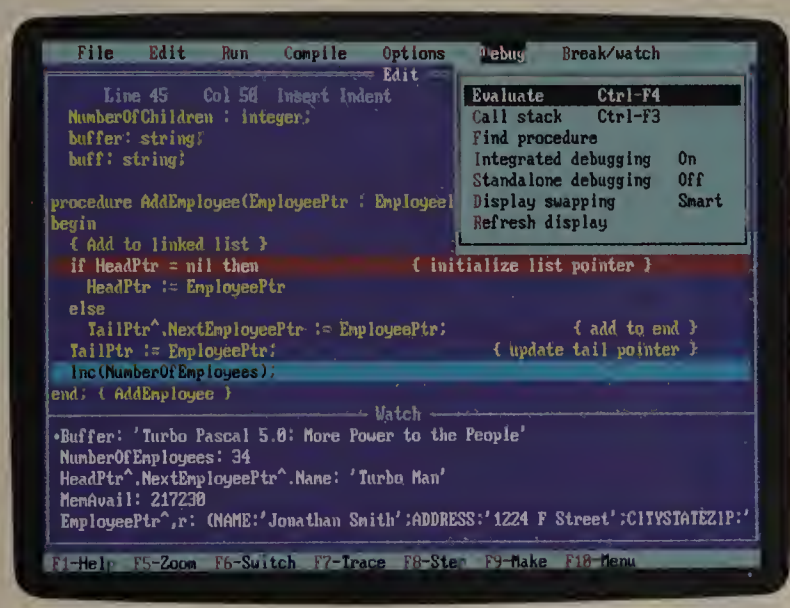

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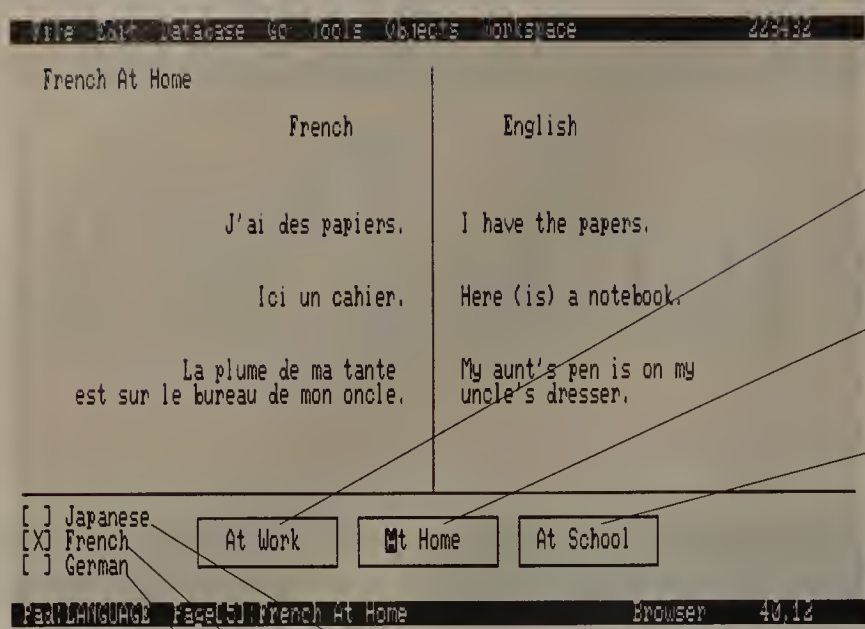

BUTTON SCRIPTS

```
Handler Select;
  Begin
    Global Language;
    Go to Page ((Language)&&"At Work");
  End;

Handler Select;
  Begin
    Global Language;
    Go to Page ((Language)&&"At Home");
  End;

Handler Select;
  Begin
    Global Language;
    Go to Page ((Language)&&"At School");
  End;
```

PAD-LEVEL SCRIPT

```
Handler openPad;
  Begin
    Global Language;
    Put "Japanese" into Language;
  End;

Handler openPage;
  Begin
    Global Language;
    Set the check of background button Language to True;
  End;

Handler Pick_Language (picked_button);
  Begin
    Global Language;
    Set the check of background button Language to False;
    Put picked_button into Language;
    Set the check of background button Language to True;
  End;
```

CHECK BOX SCRIPTS

```
Handler Select;
  Begin
    Pick_Language "Japanese";
  End;

Handler Select;
  Begin
    Pick_Language "French";
  End;

Handler Select;
  Begin
    Pick_Language "German";
  End;
```

FIGURE 1: Enter the pad-level, check box, and button scripts (as shown) in the script editor attached to each of those objects. The check box and button script editors display the shaded script lines automatically.

2. DISPLAY THE PAD'S BACKGROUND LEVEL

To make the control buttons and check boxes available on every page of the pad, choose *Background* from the Edit menu; *HyperPAD* should display 'BKGND' at the bottom of the screen.

3. CREATE THE THREE TOPIC BUTTONS

To create a button, choose *New Button* from the Objects menu. *HyperPAD* places a button on the screen that you can modify and reposition. Double-click the button or press <Enter> to display the Button Info box. Label the button **At Work**, then press **<Enter>** (or click 'Ok')—don't change any other settings. Repeat this process to create At Home and At School buttons; size each button by grabbing a corner, and arrange them as shown in **FIGURE 1**.

4. CREATE THE THREE LANGUAGE CHECK BOXES

A check box is a type of button that can be turned on or off, or from PADtalk's point of view, set to True or False. Create three check boxes named Japanese, French, and German, just like you create a button but with one difference: Select *Check Box* in the Button Info dialog box. While you're there, deselect *With Edge* and *Auto Hilite* to turn those features off. Size the check boxes to a single line each and arrange them as shown in **FIGURE 1**.

5. DRAWING LINES

To separate the button "control panel" visually from the rest of the page, choose *Line* from the Tools menu, move the cursor to the line's left starting point, hold down <Shift>, and either drag the mouse to the right or press <Cursor Right> to draw the line. At the right end, move left to display the last character of the line. Place the cursor on the middle of the line and draw this pad's vertical line.

6. CREATE AND NAME THE PAGES

Now that you've created the buttons and check boxes on the background page, you must create the pages they will take you to. Deselect *Background* in the Edit menu to leave the *HyperPAD* background. Press **<F6>** to display the Page Info dialog box, then name the page **Japanese At Work** and press **<Enter>**. Press **<F3>** to create a new page, then **<F6>** again to name it Japanese At Home. Create seven more pages named Japanese At School, French At Work, and so on. Each page should display the background buttons created earlier.

7. SCRIPT THE APPLICATION

The final task is to add the scripts that make the pad, the button, and the check boxes work. To enter the pad script, Choose *Pad Info* from the Objects menu, and select *Script* to display *HyperPAD*'s script editor. Type in the openPad, openPage, and Pick_Language handlers as they appear in **FIGURE 1.** Don't forget the final semicolon at the end of each line (except following the Begin statement). When you're finished, choose *Save and Return* from the editor's File menu to compile the script.

To add scripts to the check boxes and buttons, choose *Background* from the Edit menu, then *Selector* from the Tools menu. Double-click on a button to display the Button Info box. Select *Script*, and enter the appropriate script from **FIGURE 1.** When you're done, choose *Save and Return* from the editor's File menu, then deselect *Background* from the Edit menu to leave the *HyperPAD* background. Finally, select *Browse* from the Tools menu to leave *HyperPAD*'s programming mode.

UP AND RUNNING

To see your application in action, select *Home* from the Go menu and reopen the LANGUAGE application using *File Open*. Click a check box, then a button, and *HyperPAD* should go immediately to the correct page in your pad. You can then select *Text* from the Tools menu and add text appropriate to that page. Select *Tools Browse* to return to running the pad. Now that you know this technique, you can incorporate it into other pads you write, and even combine it with other linking patterns. ●

Jeff Walden is a freelance writer and HyperCard *developer based in Morgan Hill, California.*

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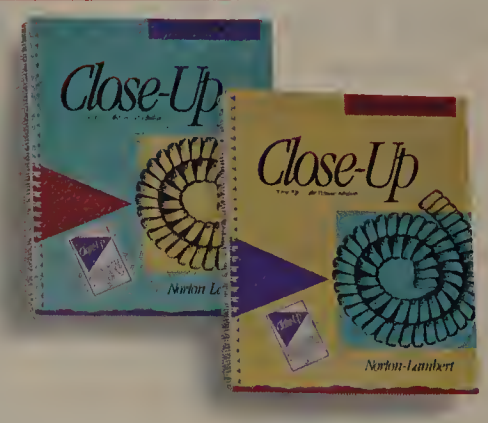

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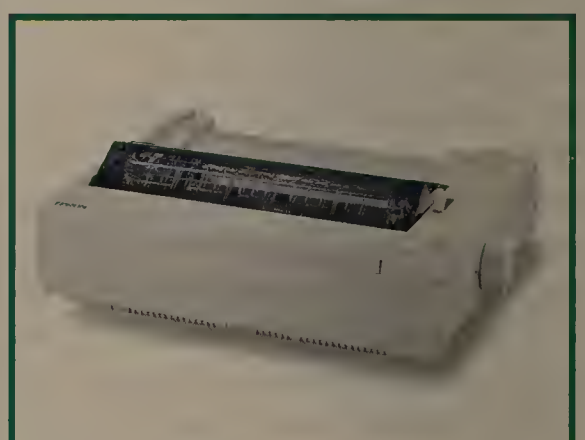

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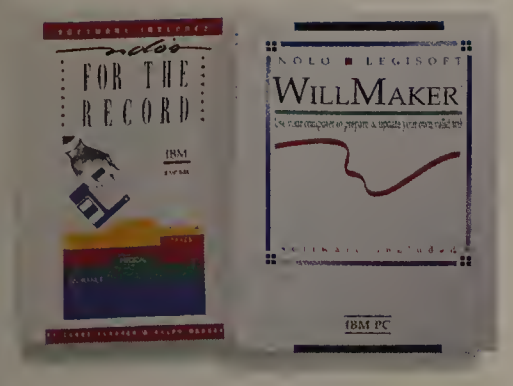

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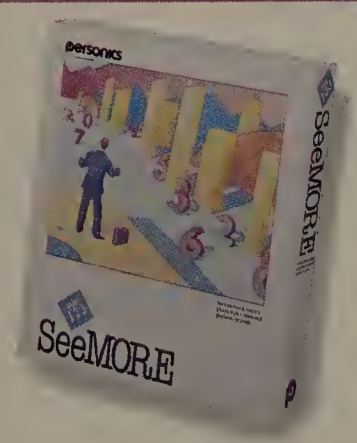

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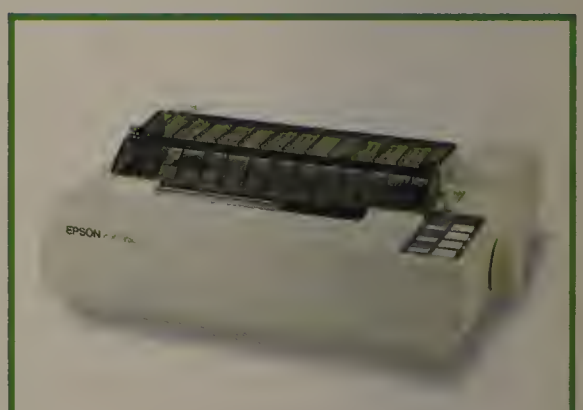

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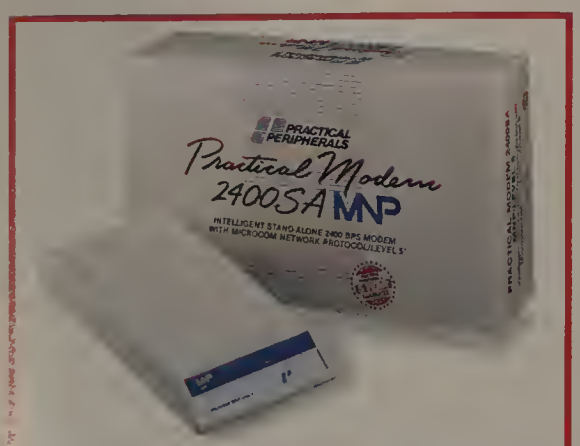

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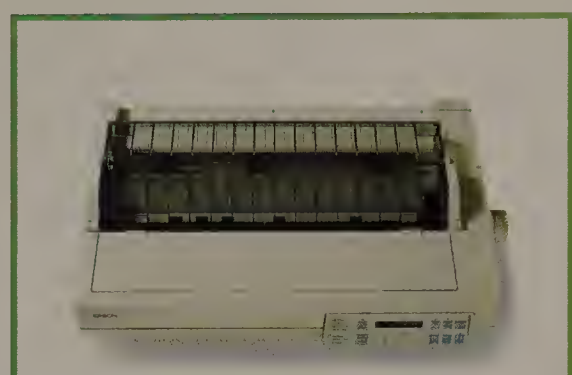

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ORGANIZING THE GLOBAL OFFICE

Big news for big business—IBM launches its ambitious OfficeVision environment and polishes up the OS/2 Presentation Manager

ERIC BENDER

Think globally, act locally. That's the game plan for *OfficeVision*, IBM's aggressive move to establish an icon-based office environment across all its main machines, from PS/2s to mainframes. *OfficeVision* will link "from 5 users to 5000 users in a consistent interface," claims Tony Mondello, vice president for office systems at IBM's Application Systems Division.

Mondello rode herd on 1000 programmers for two years to bring off the project, and *OfficeVision* spin-offs will advance the state of the art even for customers who don't need to pull far-flung offices into a corporate global village. Key among the spin-offs are upgrades to OS/2, whose graphic user interface, large memory addressing, and multitasking capabilities provide the desktop glue for the new environment.

OfficeVision is the first application family born within Systems Application Architecture, IBM's grand unification theory, which mandates common applications, user access conventions, programming tools, and communications links. In keeping with the glacial pace of SAA development, *OfficeVision* elements will trickle in rather slowly, and third-party developers must modify their own packages before *OfficeVision* reshapes the landscape.

Suite Success?

The software will run on the four strategic SAA platforms: OS/2 networks, AS/400 minicomputers, and mainframes running the VM and MVS operating systems. Even the PC versions won't come cheap—you'll need OS/2 Extended Edition with at least 7MB of memory, and you'd better figure on running it on a fast 386. Less functional versions will be delivered for DOS PCs or dumb terminals hooked to the big machines.

OfficeVision initially will offer approximately the same baseline capabilities as IBM's entrenched mainframe office automation systems—Professional Office System (PROFS) and Distributed Office Support System (DISOSS)—which it will replace in the long run.

The first programs will begin arriving this month for OS/2 local area networks. *OfficeVision/2 LAN* will include electronic mail, file system access, and address book and phone book functions. In first quarter 1990, a follow-up release will add a calendar, a document library, a file cabinet, and decision support modules (reporting, charting, data entry, and data import/export), plus a first crack at a "composite" (text/graphics/image) editor. The price is $750 per OS/2 workstation. A subset of this suite for DOS, using character-based windows, will be available for $210.

In early demos, *OfficeVision/2 LAN* showed IBM's progress toward packages that exploit OS/2's graphic user interface and smooth interplay between application modules. Once you've finished an E-mail message, for instance, you can drag it over and drop it in an out-box, and the message is in the mail.

The software also shows that IBM isn't going for world-beating form on features just yet. The calendar, for instance, is fairly rudimentary, and there are no hot links to funnel data between modules.

Snap-On Tools

Analysts emphasize that focusing on such details misses the main point. *OfficeVision* is an impressive global solution, says John Murphy, senior analyst with Wohl Associates. "It's an umbrella that everyone will shelter under."

More than an application family, *OfficeVision* is an environment that's open to all comers. This fall IBM will begin to release a set of application program interfaces (APIs) that will help developers build advanced user interfaces, tap office functions like E-mail, and manage system resources. The result is what IBM has dubbed snap-on applications, which play as full members of the family.

At *OfficeVision*'s kickoff this spring, more than a dozen software firms pledged allegiance and displayed prototypes. Most of the firms were mainframe houses (and several claimed to be pushing into OS/2 more quickly than their PC peers). Lotus revealed a glimpse of its not-yet formally-announced *1-2-3/G* and promised an *OfficeVision* version. Microsoft tied its not-yet formally-announced *Excel for Presentation Manager* to *OfficeVision*'s mail facility. WordPerfect issued a verbal endorsement. IBM hadn't briefed smaller software vendors, but most of them quickly made encouraging noises about the new environment —as would anyone planning to sell into Big Blue shops.

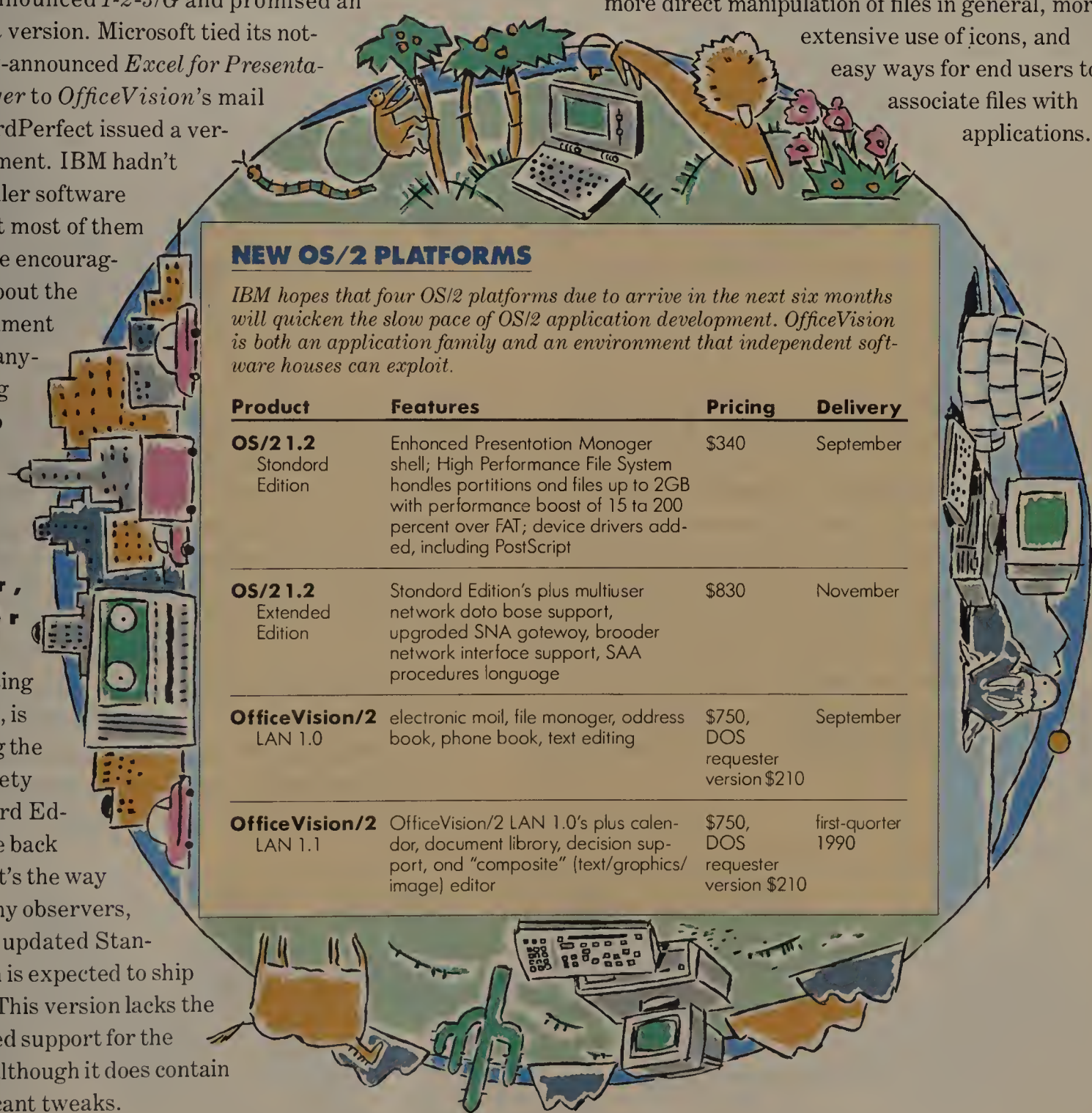
A Cleaner, Brighter OS/2

By emphasizing *OfficeVision*, is IBM pushing the garden-variety OS/2 Standard Edition onto the back burner? That's the way it struck many observers, although an updated Standard Edition is expected to ship this month. This version lacks the much-awaited support for the 80386 chip, although it does contain some significant tweaks.

For throughput, the $340 Standard Edition 1.2 features a replacement for the FAT file system. The new High Performance File System handles partitions and files up to 2GB and offers a performance boost of 15 to 200 percent over FAT. You can set up partitions for both file systems on your disk and then boot in OS/2 or DOS.

Along with extra polish, the DOS compatibility box now supports a subset of DOS 4.*x* and frees up about 30K more memory. IBM addressed the glaring lack of device drivers by promising a PostScript driver within 1.2 and other drivers, notably for LaserJets, from third parties very soon. Standard Edition 1.2 adds a built-in on-line hypertext help system for OS/2 commands. Developers can get their hands on a $650 combined tool kit/technical reference guide.

But the most striking enhancements are those that make OS/2's Presentation Manager shell a bit less clunky: more direct manipulation of files in general, more extensive use of icons, and easy ways for end users to associate files with applications.

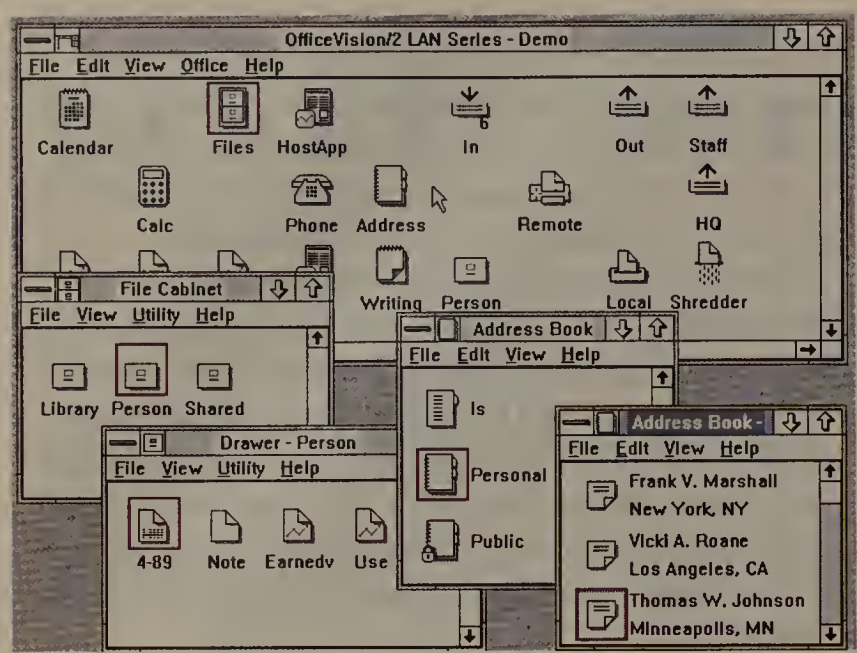


NEW OS/2 PLATFORMS

IBM hopes that four OS/2 platforms due to arrive in the next six months will quicken the slow pace of OS/2 application development. OfficeVision is both an application family and an environment that independent software houses can exploit.

Product	Features	Pricing	Delivery
OS/2 1.2 Standard Edition	Enhanced Presentation Manager shell; High Performance File System handles partitions and files up to 2GB with performance boost of 15 to 200 percent over FAT; device drivers added, including PostScript	$340	September
OS/2 1.2 Extended Edition	Standard Edition's plus multiuser network data base support, upgraded SNA gateway, broader network interface support, SAA procedures language	$830	November
OfficeVision/2 LAN 1.0	electronic mail, file manager, address book, phone book, text editing	$750, DOS requester version $210	September
OfficeVision/2 LAN 1.1	OfficeVision/2 LAN 1.0's plus calendar, document library, decision support, and "composite" (text/graphics/image) editor	$750, DOS requester version $210	first-quarter 1990

WARD SCHUMAKER



OfficeVision/2 LAN is an OS/2 network suite that provides E-mail and other office functions via an iconic interface. PC applications such as 1-2-3 and Excel will be modified to fit neatly within IBM's new office environment.

The improvements reflect advances in SAA's Common User Access scheme, the soon-to-be-beloved blueprint for user interfaces, which now reflects some of IBM's own experiences in building *OfficeVision.* This year's CUA comes in three basic flavors: object-oriented workplace (which builds on Presentation Manager, emphasizing direct results when handling icons via a mouse), graphical (Presentation Manager, or a DOS subset with character-based windows), and entry (for dumb terminals).

As the Presentation Manager shell and *OfficeVision* applications demonstrate, new frills like multilevel menus and cascading windows can greatly simplify use. Application vendors are adding further gloss; a prime example is *1-2-3/G*'s trick of lending windows a handsome three-dimensional appearance. Not all problems have been solved—the Presentation Manager mouse apparently still acts like it's underwater—but progress is being made.

Broader Extensions

The corresponding OS/2 Extended Edition 1.2 will arrive in November for $830. Its Database Manager is finally out of the gate in the SQL server race with Remote Data Services—multiuser SQL support on the *OS/2 LAN Server* local area network. The Database Manager also gains a slew of developer enhancements plus a Presentation Manager look for its Query Manager.

IBM continued to fill in the gaps for its endlessly diverse communications environments with an SNA gateway for up to 254 workstations, greater support for AS/400 and System/36 minis, the ability to run mainframe bit-mapped graphics, ethernet connections, yet more *LAN Server* APIs (bringing IBM closer to lockstep with the Microsoft/3Com *LAN Manager*), and a host of other options.

Additionally, Extended Edition acquires an SAA procedures language, an update of IBM's veteran REXX that can act as a general-purpose or macro language. Over time, the language may evolve into a helpful tool for nonprofessional users.

Okay, Who Bites?

Sparking another round of debate about adopting OS/2, the May announcements highlighted a deepening schism between large corporations and other customers.

This year's truism is that DOS is not going away. Recent months have seen a surge of support for packages that employ "DOS extenders" for added memory—the most dramatic example being *1-2-3* release 3. Simultaneously, many *Windows* packages are waiting in the wings, with an upcoming version of Microsoft's environment expected to smash the DOS memory barrier this fall. "We hear more about *Windows* than we do about Presentation Manager, from both software vendors and end users," reports Wohl's Murphy.

But Frank Ingari, vice president of Lotus's spreadsheet division, insists that "corporate customers who are going to invest serious dollars in a PC application are thinking seriously about Presentation Manager." Ingari explains that many such customers are creating run-your-business applications where OS/2's painstakingly drawn architecture will pay off. "That's a qualitative change, and it will give Presentation Manager a home in the corporate environment," Ingari says.

Unsurprisingly, IBM executives echo this refrain. And James Cannavino, president of IBM's Entry Systems Division, maintains that within a year or two, higher-density memory chips will wipe away worries about memory costs. Customers today who plan crucial projects for DOS or *Windows*, he says, are opting for "short-term actions." ●

Eric Bender is PC World's *East Coast editor.*

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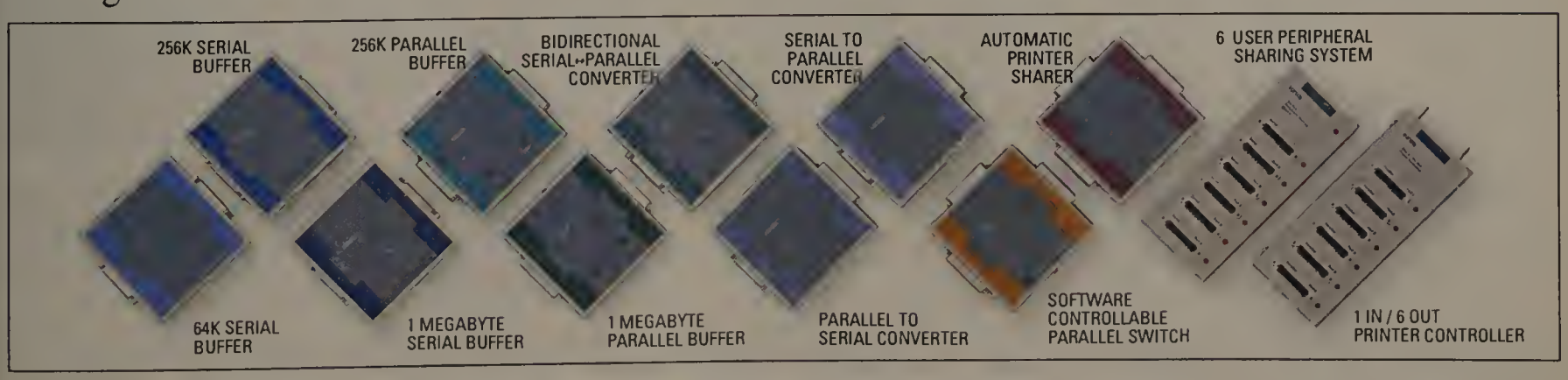
What good is it having more than one computer if you can only print from one at a time? Maybe you have different types of printers, and you'd like to use them all without having to constantly disconnect and switch cables.

Don't you think that all your equipment should work interchangeably or simultaneously as needed, without any downtime at any one station? Isn't that the reason you purchased all that high-tech hardware?

Kansai has a better connection for a better solution to your problems. Quality buffers, sharing systems and interface converters; economical but vital peripherals that can save you more time and money than you probably realize.

Why not really complete your system? Get the Kansai connection.

kansai
International, Inc.
Get the Connection.
A Subsidiary of KANSAI ELECTRIC CO., LTD.



Kansai International, Inc.: 3555 Voyager Street, Suite 201, Torrance, California 90503 / Phone: (213) 542-7626 • 1(800) 733-3374 • Fax: (213) 542-8702

Circle 149 on reader service card

How to tip the balance in your favor.

Introducing
one heavy-duty PC.

Processor: 80386	Speed: 25 Mhz
Memory: 2 Mb-18 Mb RAM	Total Slots: 8

PW² Series 300/10 80286 10 Mhz

PW² Series 500/12 80286 12 Mhz

PW² Series 800/20 80386 20 Mhz

Getting more from personal computing doesn't mean more PCs. It means balancing the right PCs with the right business solutions and connections.

PRESENTING THE RIGHT PC

Our new PW² Series 800/25A starts with 25Mhz, 80386 desktop muscle. Up to 640 Mb of mass storage, cache memory, with tape back-up and VGA displays. And Windows/386 with MS-DOS to give you both ease of use and multi-tasking flexibility.

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The best solutions are created with specific businesses in mind. So we offer you our dealer network to bring you custom-tailored software. A free book tells you who and where you can get everything from Distribution inventory control to Healthcare payroll applications.

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Unisys is an industry leader in networking. And that includes our PCs. With our USERNET², you can choose from Ethernet, Token Ring or simple twisted-pair wiring to communicate with minis, mainframes, or other PCs.

And don't worry. Despite all the added power, these are true PCs. So you can run MS-DOS, XENIX, and MS-OS/2 operating systems.

Call today for your FREE copy of the Unisys Guide to Marketers. Find out more about the new PW² 800/25A. And discover how one heavy-duty PC can tip the balance in your favor. Call 1-800-547-8362.

UNISYS AND YOU.
The power of²

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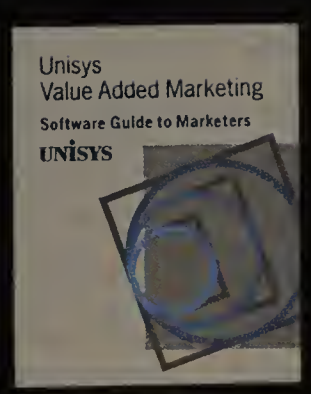
PW² Series 850/16 80386 16 Mhz

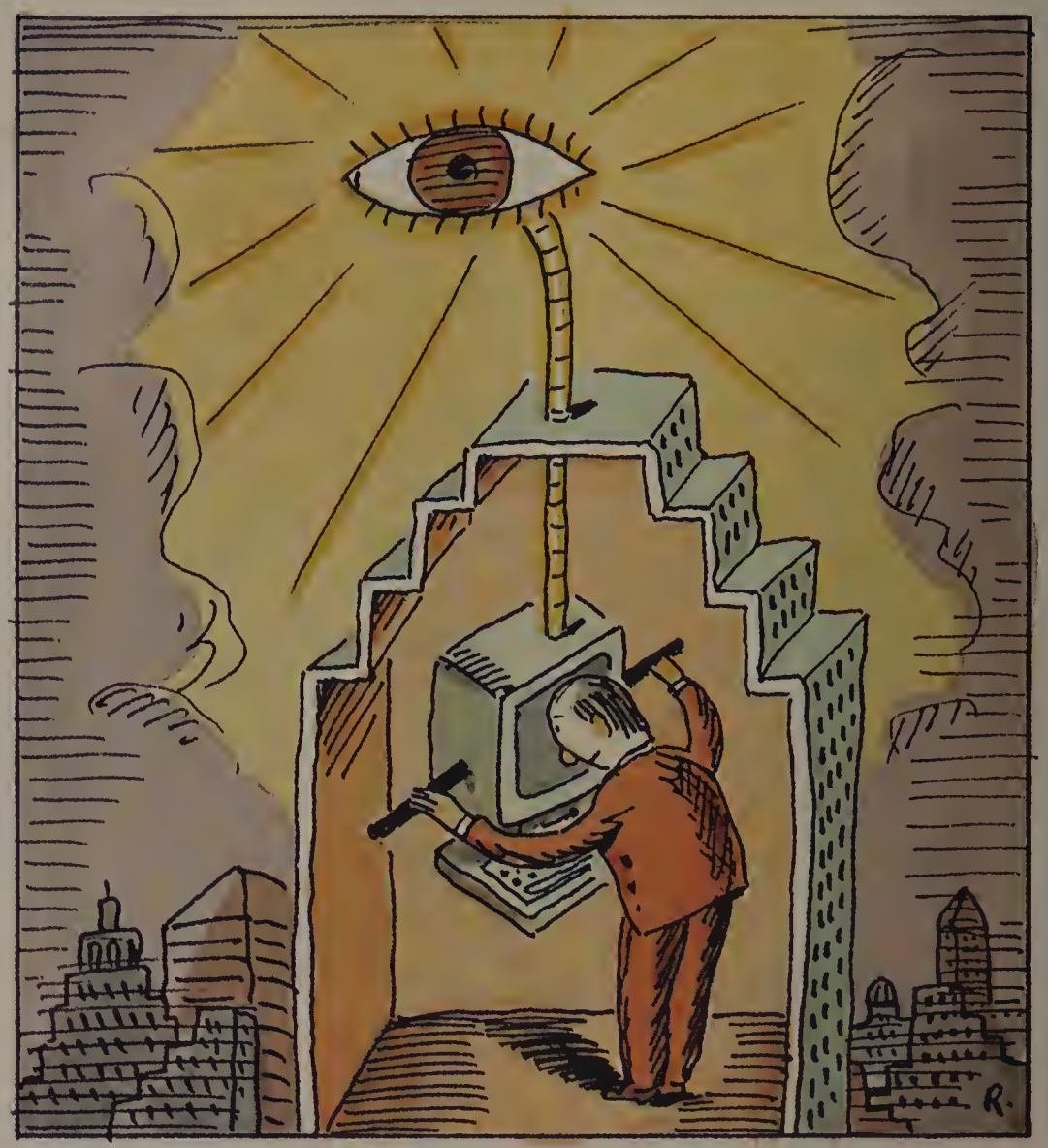


UNISYS

Circle 261 on reader service card

Give Your Business

The On-Line Edge



Alfred Glossbrenner

HOW DO YOU STAY ONE STEP AHEAD OF THE COMPETITION? HERE'S AN OPINIONATED GUIDE TO ON-LINE DATA BASES THAT'S PACKED WITH CRITICAL BUSINESS INTELLIGENCE.

Staying on top of the competition used to mean reading trade journals, attending an annual convention or two, and generally keeping an ear to the ground. These days savvy businesspeople also keep their hands on the keyboard.

On-line data bases provide competitive intelligence about everything from a company's balance sheet to an entire industry's prospects. This information is comparatively cheap, extremely wide-ranging, and, in the hands of someone who knows how to use it, enormously advantageous. The trick is to find the data bases that have the information you need.

At last count, over 4000 data bases were offered through more than 500 on-line services. The scope of these sources is vast—from data as current as 90 seconds ago to information stretching back years, decades, or even centuries.

This Buyers' Guide lists my top picks for data bases that will give you an edge in the increasingly competitive business arena. These rich sources will be a good point of departure for answering three key questions: Who are your competitors? What are your competitors doing? And who are your customers? For details on the cost of accessing this information, see **TABLE 1**.

WHO ARE YOUR COMPETITORS?

Almost any business- or news-related data base will help you identify your competitors, but the four directories listed here can provide much more information about a given company than you'll find in any news story.

D&B Dun's Market Identifiers, D&B Million Dollar Directory

One of many Dun & Bradstreet information products, Dun's Market Identifiers provides detailed information on over 2.25 million public and private U.S. companies. To qualify for a listing, a company must have five or more employees or at least $1 million in sales. To find competitors, you simply search on the basis of the government's Standard Industrial Classification (SIC) Code and a business description. The data base will tell you, among other things, each firm's sales figures for the last three years, how many customers it has, its facilities' square footage, and the name of its main bank.

The D&B Million Dollar Directory offers similar information, but here the key qualifier is a net worth (as opposed to sales) of $500,000 or more. The data base offers information on over 160,000 firms, including hard-to-find facts about many privately held companies.

Dun's Marketing Services
3 Sylvan Way
Parsippany, NJ 07054
800/223-1026, 201/605-6000
Reader service no. 602

Thomas New Industrial Products, Thomas Register Online

If new product information is what you need, Thomas New Industrial Products is a good place to start. This data base provides information drawn from product press releases submitted to two monthly magazines, *Industrial Equipment News* and *Managing Automation*, with an emphasis on new industrial products and systems.

Thomas Register Online is the leading source for "who makes what" information. This multivolume reference work covers more than 148,000 U.S. companies supplying over 50,000 classes of products marketed under more than 110,000 brand names. I've always found the printed directory unwieldy, but using the online version is a snap.

Thomas Online
One Penn Plaza
New York, NY 10119
212/290-7291
Reader service no. 603

WHAT ARE YOUR COMPETITORS DOING?

Once you've identified the specific firms you want to investigate, the following data bases and on-line services cover the fiscal records and the business-oriented publications you need to analyze your competition's financial background and business history.

Publicly held firms are the easiest to probe, since by law they must make periodic reports to the Securities and Exchange Commission (SEC), but a surprising amount of data can be found on many privately held companies (and individuals) as well.

If your quarry is particularly elusive, you'll have to use your imagination. Determine what kind of publication (newsletter, newspaper, trade journal, general interest magazine, and so on) is most likely to cover what you're interested in. Then concentrate your efforts on data bases that offer that kind of material.

ABI/Inform, ZBusiness Dateline

ABI/Inform and Business Dateline are two of the most remarkable data bases available. ABI/Inform offers instant access to over 400,000 articles from 800 international business journals and magazines. Information comes in a manageable, concentrated abstract that neatly summarizes all the important facts, figures, quotes, and other information covered in the source article. Titles range from *American Salesman* and *High Technology Law Journal* to *Fortune* and *Forbes*.

Business Dateline focuses on more than 180 regional business publications and 14 daily newspapers. Titles include *Crain's Cleveland Business*, *Memphis Business Journal*, and the *Greater Baton Rouge Business Report*. In addition to covering local issues and carrying detailed stories on major firms located in the region, the data base includes information on start-ups and family-owned and closely held firms, as well as facts about the people who own them.

UMI/Data Courier
620 S. Third St.
Louisville, KY 40202
800/626-2823, 502/582-4111
Reader service no. 604

D&B Dun's Financial Records Plus (DFR)

Getting financial information on public companies is easy (see the Disclosure data base described below), but privately held firms are not required to publish their financial data. However, many companies disclose this kind of information to Dun & Bradstreet in order to establish a credit rating. It's that information, minus the credit report, that's the basis for Dun's Financial Records Plus. The data base covers over 1.5 million U.S. businesses, 98 percent of which are pri-

ILLUSTRATIONS BY MARC ROSENTHAL

vately held. DFR reveals, among other things, up to three years of financial statements and key financial ratios for each firm.

Dun & Bradstreet Business Credit Services
1 Diomond Hill Rd.
Murroy Hill, NJ 07974
800/255-1033
Reader service no. 605

DataTimes

DataTimes is an on-line system, not a separate data base. Like Vu/Text (see below), DataTimes specializes in local and regional newspapers—that's newspapers, not regional business publications. For example, among the nearly 44 papers covered are the *San Francisco Chronicle*, the *Chicago Sun-Times*, and *Newsday*.

DataTimes
14000 Quail Springs Pkwy. #450
Oklohomo City, OK 73134
800/642-2525, 405/751-6400
Reader service no. 606

Disclosure

Although it's no longer the only data base covering this subject, Disclosure has long been *the* source of public company financial information filed with the SEC. The information comes from 10-K's, 10-Q's, 8-K's, proxy statements, annual reports, tender offer/acquisition reports, and other documents.

Disclosure covers over 12,000 companies that have at least 500 shareholders and at least $5 million in assets. The following are not covered: management investment companies, mutual funds, real estate limited partnerships, and oil and gas drilling funds.

Disclosure
5161 River Rd.
Bethesdo, MD 20816
800/843-7747, 301/951-1300
Reader service no. 607

Investext

Investext is a data base of company and industry reports, prepared by securities analysts from some 60 investment banking and financial research firms, including Merrill Lynch, PaineWebber, First Boston Corporation, and Salomon Brothers. Investment banking firms usually provide these reports only to their best customers. The reports are produced by analysts who focus exclusively on a given industry, market, or company. The information can be invaluable for competitive analysis, market research, and financial forecasting.

Thomson Financial Networks
11 Farnsworth St.
Boston, MA 02210
800/662-7878, 617/345-2000
Reader service no. 608

McGraw-Hill Publications Online

A look at the publications offered in this data base will confirm McGraw-Hill's reputation as an information powerhouse. Updated weekly, the data base contains the full text of magazine articles from 1985 to the present for titles that include *Aviation & Space Technology Weekly*, *Business Week*, *Byte*, and *Waste-to-Energy Report*. An important point: On Dow Jones News/Retrieval, this data base is called the McGraw-Hill Library.

McGraw-Hill Publications Online
1221 Sixth Ave.
New York, NY 10020
212/512-2911
Reader service no. 609

NewsNet

NewsNet is an on-line service offering access to over 350 business and professional newsletters. These publications have print-version subscription rates ranging from several hundred dollars to several thousand dollars per year. Titles include *Fiber Optic News*, *Environmental Compliance Update*, *Health Care Competition Week*, and *Television Digest*.

Most major industries are represented; coverage of high-tech and electronic industries and companies is particularly comprehensive. The information is concentrated, expert, and, thanks to NewsNet's system software, exceptionally easy to retrieve.

NewsNet Inc.
945 Hoverford Rd.
Bryn Mowr, PA 19010
800/345-1301, 215/527-8030
Reader service no. 610

Nexis

Nexis is an on-line system, not a data base, that's well known as a source of full-text magazine and newspaper articles rather than summaries or abstracts. It is also the sole on-line source for several publications, including the complete *New York Times* from June 1980 on, and the only place to find transcripts of the "MacNeil-Lehrer Newshour."

Mead Data Central
P.O. Box 933
Dayton, OH 45401
800/227-4908
Reader service no. 611

PR Newswire

This data base carries over 80,000 press releases a year, most of which are issued by publicly owned companies, including about 85 percent of the Fortune 1000 and most companies on U.S. stock exchanges. Releases also come from public relations firms, trade associations, labor unions, political parties, governmental agencies, and cultural and educational institutions.

The data base's major focus is business and financial news, including information on mergers and acquisitions, tender offers, earnings, dividends, contracts, and management changes. But medicine, science, sports, and general interest news is included as well.

PR Newswire
150 E. 58th St.
New York, NY 10155
800/832-5522, 212/832-9400
Reader service no. 612

PTS PROMT

That's not a misspelling. PROMT stands for Predicasts Overview of Markets and Technology, and like ABI/Inform it's one heck of a data base. Coverage includes new products and technologies, mergers and acquisitions, capital expenditures, market data and marketing strategies, foreign trade, and government regulations. The information is drawn from over 1200 business, financial, and trade publica-

tions including magazines, newspapers, newsletters, and reports. Additionally, PROMT includes the COMLINE News Service, which contains English-language abstracts of articles and news originally published in Japanese.

Predicasts
11001 Cedar Ave.
Cleveland, OH 44106
800/321-6388, 216/795-3000
Reader service no. 613

Vu/Text

Like DataTimes, Vu/Text is an on-line system specializing in regional newspapers. Vu/Text is owned by Knight-Ridder, the same company that owns Dialog, and it lists among its full-text data base entries the *Anchorage Daily News*, the *Sacramento Bee*, the *Orlando Sentinel*, and the *Philadelphia Inquirer*. The system offers about 50 newspapers, 75 percent of which are not available anywhere else on line. Most information is available for searching within 48 hours of publication.

Vu/Text Information Services
325 Chestnut St. #1300
Philadelphia, PA 19106
800/323-2940, 215/574-4400
Reader service no. 614

The Wall Street Journal

It's certainly difficult to see how anyone in business today can afford to ignore the *Wall Street Journal*. Although it's widely indexed by other data bases, the complete text of the *Journal* is available exclusively via Dow Jones News/Retrieval. The data base goes back to January 1984, and the current day's edition is on line and ready for searching by 7 a.m. eastern time each weekday.

Dow Jones News/Retrieval
P.O. Box 300
Princeton, NJ 08543-0300
800/522-3567, 609/452-1511
Reader service no. 615

TABLE 1

On Line, Time is Money

● yes ○ no

Here's a guide to the hourly cost of using the data bases and on-line services listed in this article. But the buck doesn't stop here. You also have to pay connect-time charges and data retrieval fees, as well as an annual subscription fee to an on-line access service.

Data base/On-line service	Main access system	Access cost/hour[1]	Reduced rate service
ABI/Inform	BRS	$80	●
	Dialog	$114	●
	Nexis	$32	○
Business Dateline	BRS	$90	○
	Dialog	$126	○
	DJN/R[2]	$168	●
	Vu/Text	$90	○
Cendata	Dialog	$36	○
Commerce Business Daily	Dialog	$54	○
D&B Dannelley Demographics	Dialog	$60	○
D&B Dun's Electronic Yellow Pages	Dialog	$72	○
D&B Dun's Financial Records Plus	Dialog	$135	○
D&B Dun's Market Identifiers	Dialog	$100	○
D&B Million Dollar Directory	Dialog	$105	○
DataTimes	DataTimes	$110	●
Disclosure	BRS	$45	●
	Dialog	$45	○
	DJN/R[2]	$168	●
	Nexis	$32	○
Investext	BRS	$102	○
	Dialog	$96	○
	DJN/R[2]	$168	●
	NewsNet	$252	●
McGraw-Hill Publications Online	Dialog	$96	○
	DJN/R[2]	$168	●
NewsNet	NewsNet	$84–$252[3]	●
Nexis	Nexis	$7–$19[4]	○
PR Newswire	Dialog	$96	○
	DJN/R[2]	$168	●
	Nexis	$32	○
	NewsNet	$84	○
	Vu/Text	$90	○
PTS PROMT	BRS	$110	○
	Dialog	$126	○
Sales Prospector	NewsNet	$252	●
Thomas New Industrial Products	Dialog	$96	○
Thomas Register Online	Dialog	$100	○
Vu/Text	Vu/Text	$90	●
The Wall Street Journal	DJN/R[2]	$168	●

1 All prices are for 1200-bps modems. 2 Dow Jones News/Retrieval. 3 Fees vary according to newsletter searched. 4 Per search.

For more information about all services in this section, circle reader service no. 901.

WHO ARE YOUR CUSTOMERS?

Targeting customers is a science in itself. The data bases listed below should help you identify potential markets and uncover sales leads. If you want to know who your customers are and where they live, or if you want to pin down their likes and dislikes, try these data bases.

Cendata

Produced by the U.S. Bureau of the Census, Cendata offers a broad selection of statistical data and textual information on subjects like agriculture, business, construction and housing, foreign trade, manufacturing, and population. The agency's 20 most recent press releases are included along with information on nearly 200 foreign countries.

If you want to track the average price of a new single-family house over the last three years, Cendata is the place to look.

You can also obtain an extensive list of phone numbers that tell you whom to contact at the bureau for specific census-related information.

Data Access and Use Staff
Data User Services Division
U.S. Bureau of the Census
Washington, D.C. 20233
301/763-2074
Reader service no. 616

Commerce Business Daily (CBD)

This data base corresponds to the U.S. government publication of the same name. As most people know, the federal government buys *everything.* And when any of the 4500 or so government agencies has a "procurement action" totaling between $5000 and $100,000, depending on the agency, it is legally required to submit a standardized synopsis of its needs to the Department of Commerce for publication.

Using this data base, you can discover within seconds whether the federal government is in the market for whatever it is you sell and, if it is, where to send your proposal. CBD is available on Dialog, and with that system's "current awareness" feature, you can even have a search conducted automatically for $1.50 per day. The results will be sent to your electronic mailbox, where you can pick them up at your convenience.

Commerce Business Daily
U.S. Department of Commerce
Rm. 2852
Washington, D.C. 20230
202/377-0632
Reader service no. 617

D&B Donnelley Demographics

Like Cendata, this data base includes data from the 1980 U.S. census, the latest available. But Donnelley uses proprietary techniques to produce highly focused current-year estimates and five-year projections. Each state, county, ZIP code, metropolitan statistical area, area of dominant influence, and designated marketing area is covered.

If you need to know, say, the average household size and median household income in Stark County, Ohio, this data base can provide that information. Among other topics covered for each area are residents' age, race, sex, occupation, marital status, and education; number of households; household income; and industries.

Donnelley Marketing Information Services
70 Seaview Ave.
P.O. Box 10250
Stamford, CT 06904
203/353-7474
Reader service no. 618

D&B Dun's Electronic Yellow Pages (EYP)

This data base of 8 million U.S. businesses and professionals is compiled by Dun's Marketing Services, a leading mailing list company. You can use EYP as a quick directory, of course, but it's especially valuable for generating highly focused telemarketing prospects or mailing lists.

Among other search criteria, you can specify state, county, city, city population, number of employees, telephone area code and exchange, and ZIP code. Add those to a specified type of business, and you can quickly produce a list of, say, all the bicycle repair shops in Brooklyn. If you like, you can have search results formatted as mailing labels for 12 cents each.

Dun's Marketing Services
Reader service no. 619

Sales Prospector

This is a series of 16 newsletters covering industrial, commercial, institutional, and local government expansion plans and activities. For example, if the city of Delran, New Jersey, gets a government grant to build a new library, that fact will appear in a newsletter that covers New Jersey and surrounding states. Corporate relocations are also covered. Sales Prospector focuses on companies and institutions that are likely to be in the market for goods, services, or employees in the near future.

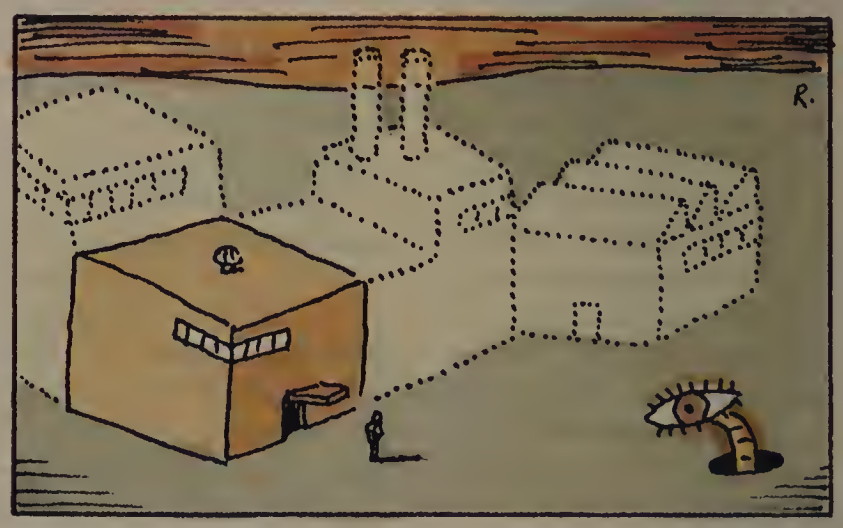
Prospector Research Service
751 Main St.
Waltham, MA 02154
617/899-1271
Reader service no. 620

BEFORE YOU LOG ON

On-line information retrieval is not a skill you can expect to acquire overnight, any more than you'd expect to master *1-2-3* or *dBASE* in a 1-hour session. To cut costs, it's a good idea to practice on a low-cost data base or use cheaper after-hours options. Try to make your search requests as specific as possible to keep charges down. Investing the time to refine your online search skills will help you find vital information fast and keep costs to a minimum. ●

Alfred Glossbrenner's many books cover communications and personal computing. His latest is Alfred Glossbrenner's Master Guide to Free Software for IBMs and Compatibles *(St. Martin's Press, New York, 1989).*

For more information about all services in this section, circle reader service no. 901.



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- *More than 100 included free*
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Corel DRAW! 1.1	$595
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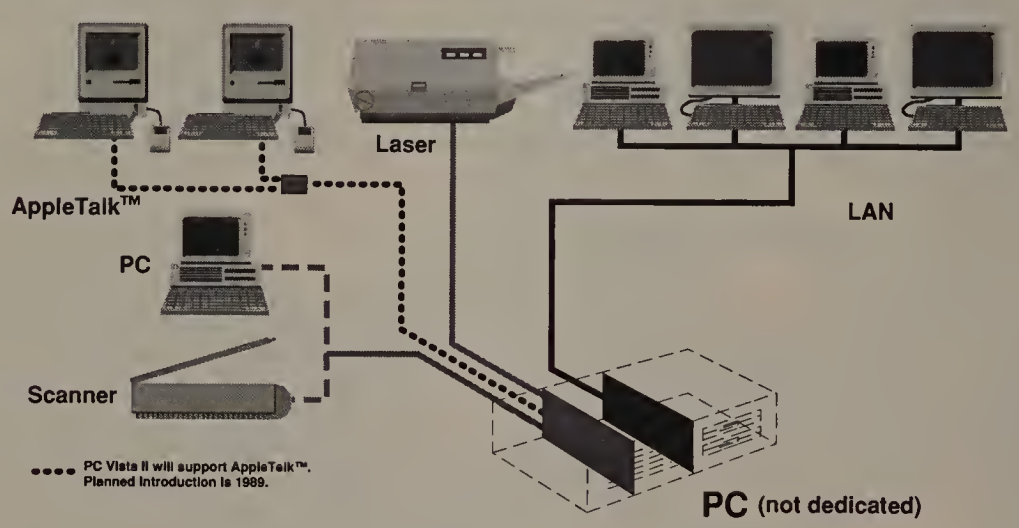
SEYBOLD

COREL
(613) 728-8200

Circle 211 on reader service card

For $499 we not on
Series II compatibility



The PC Vista controller gives you a variety of connectivity options, including built-in support for LANs.s.

The best idea in printing outside of a laser printer.

Separating the controller from the laser engine gives you a wealth of advantages. For one thing, you suddenly have virtually unlimited flexibility. You can choose the external video engine that suits your requirements best, ranging from 6 to 15 page per minute models.

The PC Vista controller comes with 512K of memory, expandable to 4MB. And, since you may not need all of that memory for downloaded fonts and graphics, PC Vista lets your PC access it as extended memory. The controller supports EMS version 3.2, so it's like getting two cards in one—a printer controller and an expanded memory card.

Introducing PC Vista.

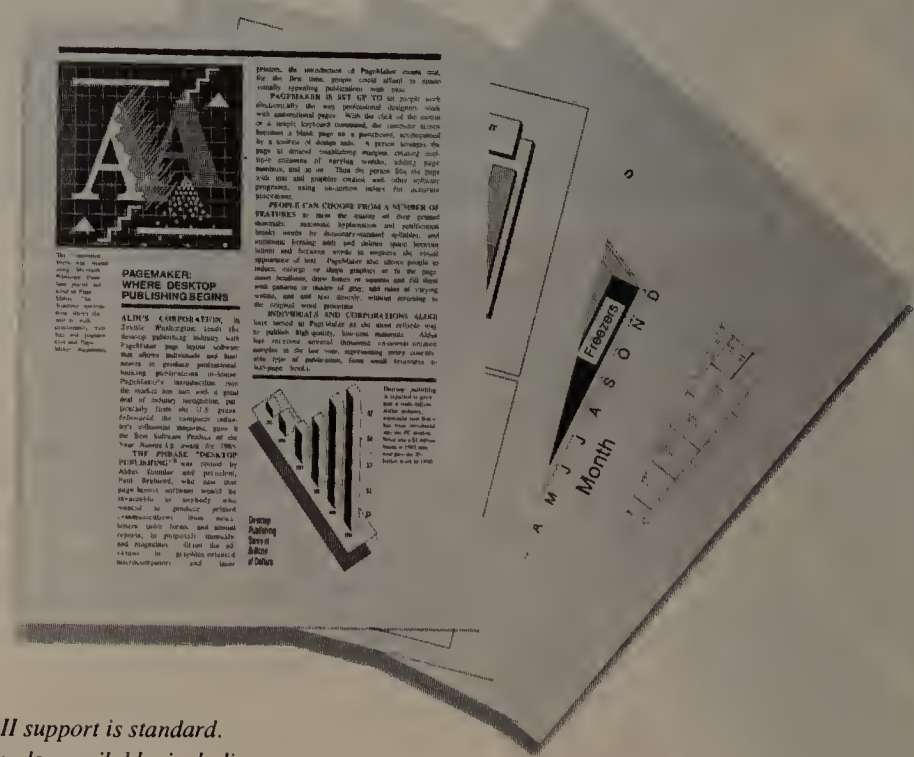
PC Vista™ is a whole new way to get high performance laser printing output with a separate controller and laser engine.

For just $499, you can put a controller card in your PC that delivers Hewlett-Packard®LaserJet® Series II compatibility to the new generation of external video laser printers from Ricoh®, Canon®, and others.

In many cases PC Vista is actually faster than the Series II's own controller. And since it's completely independent of the host PC processor, it won't slow you down.

The PC Vista controller includes 12 standard fonts. And it supports all HP LaserJet Series II soft fonts. You can download up to 64 fonts and use as many as 32 fonts per page.

But wait. There's more.



Full LaserJet Series II support is standard. Other emulations are also available, including a PostScript-compatible interpreter.

y give you LaserJet
We give you the future.

An ideal multi-user solution.

PC Vista has support for LANs built right in. That means anyone on the network can access the printer.

What's more, the controller's external serial I/O connector can also be used for input from another PC, workstation, switcher box, or other device. So you can easily and inexpensively share the printer even without a LAN.

It makes laser printer obsolescence obsolete.

As industry standards—and your needs—change, your PC Vista system can change right along with them. You can add printing support for new applications. Add users. And add new networks.

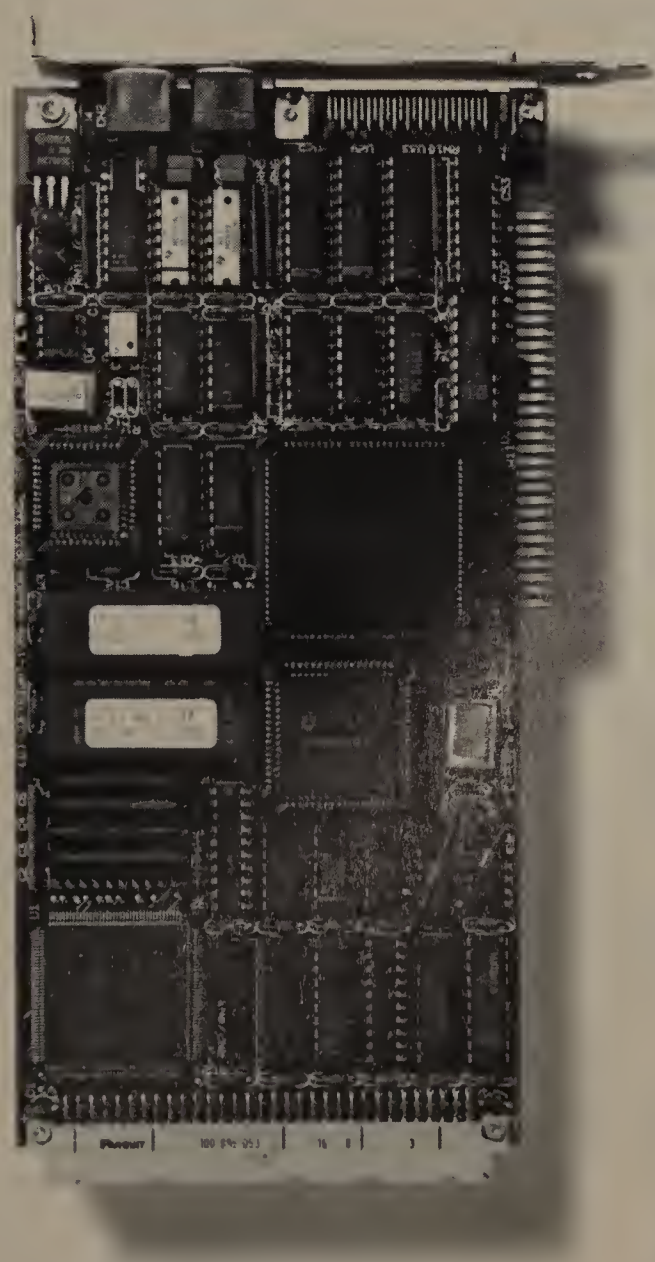
Already you can add Epson® FX-80, IBM® Proprinter XL, HPGL® HP-7475A, and PostScript®-compatible interpreter emulations. More will be added as standards evolve.

PC Vista. Because printers should print and computers should think.

If the idea of a new technology that makes it easy to share your printer, grows with your needs, and stays compatible with evolving standard appeals to you, we have a suggestion:

Call us today at **(800) 842-8540** Ext. 10 for more information about the PC Vista controller and the name of your nearest dealer.

It's as powerful as it is affordable. It's also your guarantee that future laser printers won't leave you behind.



By separating the controller from the laser engine, PC Vista opens up a whole new world of expandability.

Complete PC Vista system requires adapter cable kit and external video engine of choice. 512K memory standard, additional memory available in .5 MB increments.

Limited time offer: Free PostScript-compatible interpreter.

Right now when you purchase the HanZon PC Vista controller and 2.5MB* memory upgrade, you'll also get a Microsoft® certified PostScript-compatible interpreter free—retail value, $399. Call for details, offer ends October 31, 1989.

*2.5MB memory upgrade required to use PostScript compatible interpreter.

HANZON

The printer control people.

22032 23rd Drive SE
Bothell, Washington 98021-4414

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Circle 105 on reader service card

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Simple and powerful batch files can save you time and keystrokes. And best of all, they don't cost a dime.

Programming

Michael Goodwin

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TIPS & TECHNIQUES

180 **Linking Files With Word 5.0**
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Executable files—those ending in .COM, .EXE, or .BAT—are files that make things happen. Batch (.BAT) files are the only executable files you can write using nothing more complicated than a line editor or word processor.

A batch file is a series of DOS commands written as an ASCII file and saved with a .BAT extension. When you call the batch file (by typing its name and pressing <Enter>), the commands basically execute in the order you entered them (advanced batch files can branch).

There are so many clever batch file techniques, we could fill this entire issue with tips and still not cover the lot of them. This article introduces a few basic concepts; for more ideas, see *The Help Screen* in this issue.

Shortening Paths

One chief batch file benefit is not having to remember exactly where things are on your hard disk. For example, to change to the C:\FILES\WORKING\CLIENTS\DATABASE subdirectory, you could use a batch file called DATA.BAT containing the line CD C:\FILES\WORKING\CLIENTS\DATABASE. This kind of batch file functions like an autopilot, and if you write one for every subdirectory on your hard disk, you'll never have to type in another long path name again.

A variation on this theme can save you time by loading applica-

tions quickly and easily. Say you've got 12 applications, each in a different subdirectory, and you want to be able to call them from anywhere on the hard disk. One solution is to put all 12 subdirectories on the search path. (The PATH statement—usually part of your AUTOEXEC.BAT file—gives DOS a list of subdirectories in which to search for executable files it can't find in the current default subdirectory.) The disadvantage to this approach is that DOS wastes time searching through up to 12 subdirectories before finding the application you want.

To speed things up, you can create a \BATCH subdirectory just below the root; this is where you'll put all your batch files. Put this subdirectory first on the search path by rewriting the PATH statement in your AUTOEXEC.BAT file.

Now, write a batch file for each application. Suppose you have *WordStar 5.5* (installed as WS55.EXE) in a subdirectory called C:\WRITE\WS55, and your text files are located in C:\WRITE\TEXT. Write a batch file called W55.BAT with the lines:

```
CD C:\WRITE\TEXT
C:\WRITE\WS55\WS55
```

When you want to run *WordStar*, just type W55 <Enter>. DOS looks in \BATCH, finds W55.BAT, and runs it, which moves you to C:\WRITE\TEXT and then runs WS55.EXE from the C:\WRITE\WS55 subdirectory. Write similar batch files for all your applications, and you'll be surprised how quickly they can be up and running.

So Nice You Can Do It Twice

Sometimes you may wish to load applications two at a time with the same batch file. For instance, if you normally load a keyboard macro processor like *ProKey* along with *WordStar*, you could automate the process by adding *ProKey* to W55.BAT. That file would then look like this:

```
CD C:\WRITE\TEXT
C:\PRO\PROKEY
  C:\PRO\WS.PRO/R
C:\WRITE\WS55\WS55
```

This would move you to C:\WRITE\TEXT, load *ProKey* from the C:\PRO subdirectory, read in the file where you store your macros (WS.PRO), and then run *WordStar*.

Batch to Batch

You can arrange for batch files to load other batch files in one of two ways. You can simply include the name of the second batch file as the last line of the first batch file. Or, if you want batch file number two to execute in the middle of batch file number one, and then have batch file number one continue, use the CALL command that's included in DOS 3.30 and later versions (users of earlier DOS versions can substitute C:\COMMAND /C for CALL).

Suppose you're the type who likes to clean up a directory before loading an application but doesn't like writing the same lines over and over. First, create a batch file called DEL_BAK.BAT with these lines:

```
DEL *.BAK
DEL *.TMP
```

Now DEL_BAK can do your housecleaning for you. For example, to delete all .BAK and .TMP files in the C:\WRITE\TEXT subdirectory before loading *WordStar*, you could rewrite W55.BAT as follows:

```
CD C:\WRITE\TEXT
CALL DEL_BAK
C:\PRO\PROKEY
C:\PRO\WS.PRO/R
C:\WRITE\WS55\WS55
```

Working Without a Net

Brave (or foolish) folks can use batch files' ability to take input from other files to disable DOS's cautious 'Are you sure?' messages. For instance, if you often use the DEL A:*.* command to delete files from floppy disks and don't like having to confirm this request every time by typing Y, create a batch file called DEL_A.BAT with the line DEL A:*.* < C:\BATCH\YES.

The < is the redirect symbol. It tells the batch file to take input from a file—in this case, the YES file in the C:\BATCH subdirectory. To create the YES file, simply use your word processor (in ASCII mode, of course), type Y<Enter>, and save the file.

From now on, when you issue DEL_A, DOS will delete all the files on the disk in drive A: without asking you whether you're sure. So you'd better *be* sure.

Just the Beginning
These suggestions are merely the tip of a large and useful iceberg. See your DOS manual for more details on batch commands, and watch *Star-Dot-Star* and *Tips and Techniques* in *PC World* for the latest ideas from our readers. And if *you* come up with a whizbang batch file, send it in; sharing one is even more fun than writing one.

TIPS & TECHNIQUES

Word Processing

Linking Files With Word 5.0

Assembling complex documents is a cinch with Word's powerful bookmark and document-linking commands.

What you need: Microsoft Word 5.0

In most offices, it's common practice to create documents that contain text culled from other sources. Now you can automate the process with *Word 5.0*'s bookmarks and the Library Link Document command.

Both features sprouted from seeds sown in *Word 4.0*. The Bookmark command is an enhancement to *4.0*'s Jump command, which enables you to move to any document page. With *5.0*'s bookmarks, you can tag and name portions of text and then jump to any of them instantly.

Library Link, which hauls spreadsheet data into a *Word* file, now has an addition called Document that lets you pull in specified (bookmarked) text from any *Word* file. In tandem, these new features enable you to create links between two files. Although the links are static, you can update them easily. As an example, this article shows you how to forge links between line items in a price list and price quotes in a customer letter.

Bookmark Basics
First create the price list shown in **SCREEN 1**: Center the first line (**<Alt>-C**) and underline the second line completely (**<F10> <Alt>-U**). While the second line is still highlighted, press **<Esc>** to access the main menu, **F** to display the Format menu, and **K** to stamp the text with a bookmark.

Word prompts you to name the bookmark. Bookmark names can contain up to 31 characters, including hyphens, underscores, and periods (but not spaces). Enter **heading** and press **<Enter>**. Type in the line items and then highlight the first item's entire line with **<F10>**, issue **<Esc>FK**, and enter the bookmark name **bear**. Repeat the process for the second and third item lines, using the bookmark names **booby** and **error**, respectively, and save the list as PRICE.DOC.

Now you can use the Jump command to find the bookmarks. Press **<Esc>JK**, type in **heading** (or press <F1> to display a list of bookmarks), and press **<Enter>**. *Word* zips to the bookmarked text.

You can also delete, rename, or move a bookmark. To delete a bookmark, jump to it, then press <Esc>FK. Leave the bookmark name field blank, and press <Enter>Y to confirm the deletion. To rename a bookmark, delete the old bookmark, press <Esc>FK, and enter the new name. If you want to attach a previously used bookmark name to a new piece of text, just highlight the new text, press <Esc>FK<F1>, select the bookmark name, and press Y. The old text will no longer have a bookmark.

Linking Documents With Bookmarks
Bookmarks are handy, but they really shine when teamed with *Word 5.0*'s document link feature.

Split open a second window and create the letter shown in **SCREEN 1**: Simply type in the first paragraph; the remaining information will be inserted once you create links with the price list. Then, to link the first line of pricing information, the heading, press **<Esc>LLD** to activate the Library Link Document command. Type in the name of the price list document **PRICE.DOC** (or press <F1> to choose its name from the directory).

At this point, pressing <Enter> would link the entire document. However, we want to link a single element from the price file. So press **<Tab>** to move to the Bookmark field, then press **<F1>** to see a list of the bookmarks in PRICE.DOC. Select 'heading', and the bookmarked text appears at the cur-

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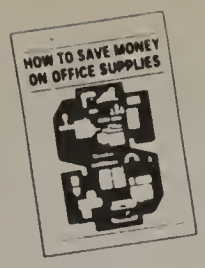

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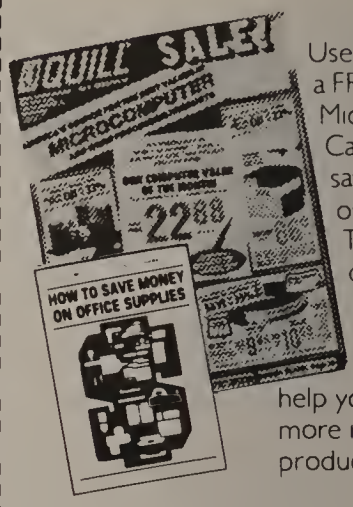

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```
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10023        Booby Trap               6.79     5.95    5.49
10025        Error Trap              57.87    52.75   47.95
                                                        PRICE.DOC

Dear Mr. Customer:

Thank you for your interest in Amalgamated Traps. Here are
the current prices for the traps you need.
.D.
.D.PRICE.DOC,heading
.D.
.D.PRICE.DOC,booby
10023        Booby Trap               6.79     5.95    5.49
.D.
.D.PRICE.DOC,error
10025        Error Trap              57.87    52.75   47.95
.D.
                                                        LETTER.DOC
```

SCREEN 1: Here's a bookmarked price list and its links to a price quote letter. Word 5.0 automatically implants codes when you create a link, but you can clear them from the screen using the Options menu.

sor location with all character and paragraph formatting intact. To add the items from the price list, just repeat the process for each bookmark, or create a macro to do this.

Note that the text you've imported from the price list includes hidden-text markers. If you don't want to see the markers, choose Options and select No in the Show Hidden Text field. Finally, save the finished price quote letter, LETTER.DOC, in the same directory that contains the price list file.

Updating Bookmark Links

Naturally, you'll need to update the links when you change the price list. To do so, modify the prices in PRICE.DOC, and save that file. Next you need to highlight the text you want to update, including the hidden codes (use <Esc> Option and select Yes in the Show Hidden Text field to reveal the codes). Select the entire letter with **<Shift>-<F10>**. Then, press **<Esc>LLD** to open the link. Leave the Filename and Bookmark fields blank, and press **<Enter>**. *Word* finds each linked section that has been modified, displays it, and asks if you want to update the text. If you press Y, the changed text appears on screen.

Unfortunately, *Word* doesn't allow global updates, but here's how to create a macro that updates all the links in the sample price quote letter.

With the cursor in the letter document, press **<Shift>-<F3>** to begin recording, then press **<Shift>-<F10>** to select the entire document. Type **<Esc>LLD** to open the link. Press **<Shift>-<F3>**, type **UpdatePrices.mac^** at the prompt, and then press **<Ctrl>-U<Enter>**. Save the macro by pressing **<Esc>TGS<Enter>**.

This macro will be useful the next time you want to update the letter with changes made to the price list. From the letter document, press <Ctrl>-U; then just press <Enter> to begin updating. At the prompt, press Y to update data or N to move to the next bookmark.

Word Marks the Spot

Bookmarks and document links come in handy for many tasks. For example, you can link legal documents or business letters to one file containing boilerplate text. When you change a boilerplate, you can quickly update the documents as well. You can also transfer text that uses line-draw embellishments, distinctive fonts, or even graphics for use in special report formats. *Word 5.0* streamlines the process of weaving documents together.
—*George Campbell*

Communications

Crosstalk XVI at Your Command

No two on-line services use the same command language. By customizing function key assignments, you can use the same Crosstalk keystrokes for them all.

What you need: Crosstalk XVI (or Mirror I or II), a modem, and subscriptions to two or more on-line services

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Circle 22 on reader service card

than you have to learn a new set for the next. For example, to leave AT&T-Mail, you type QUIT or EXIT; on BIX, CompuServe, Delphi, or GEnie, it's BYE; and on MCI Mail, EXIT. (On a BBS, the log-off command can be anything from A to X.) Even after you learn these commands, it's easy to confuse services and issue the wrong command.

Fortunately, you can adapt your communications software so the same function key combination performs the same action in all your services. This article shows how to assign uniform commands to function keys in *Crosstalk XVI*—and its clones, *Mirror I* and *II*—for maximum on-line efficiency.

A Command Assignment

In *Crosstalk XVI*, you can assign commands to any function key without interfering with the program's operation (see **FIGURE 1**). If you use <Shift>, <Ctrl>, and <Alt> keys, 40 function key assignments are possible. Note that *Crosstalk XVI* assigns log on information to some of the <Ctrl>-*key* combinations; we'll tell you how to check them before you change assignments.

Crosstalk stores function key assignments in the command files for the various on-line services it lists on the main menu. Any string or command can be assigned to a key, including control characters, carriage returns, and delays.

The trick is to assign the same *type* of command to the same function key for all your favorite services. For example, if you assign each service's XMODEM upload command to <Shift>-<F9>, you won't have to remember whether to type UP MENU, 5, or UP. And *Crosstalk XVI* automatically loads the appropriate command file each time you dial up that service. You can also use function keys to issue commands to *Crosstalk XVI* in local mode, rather than to the on-line service; for convenience, you may want to use the <Alt> keys for this.

FIGURE 1

A Crosstalk Function-Key Sampler

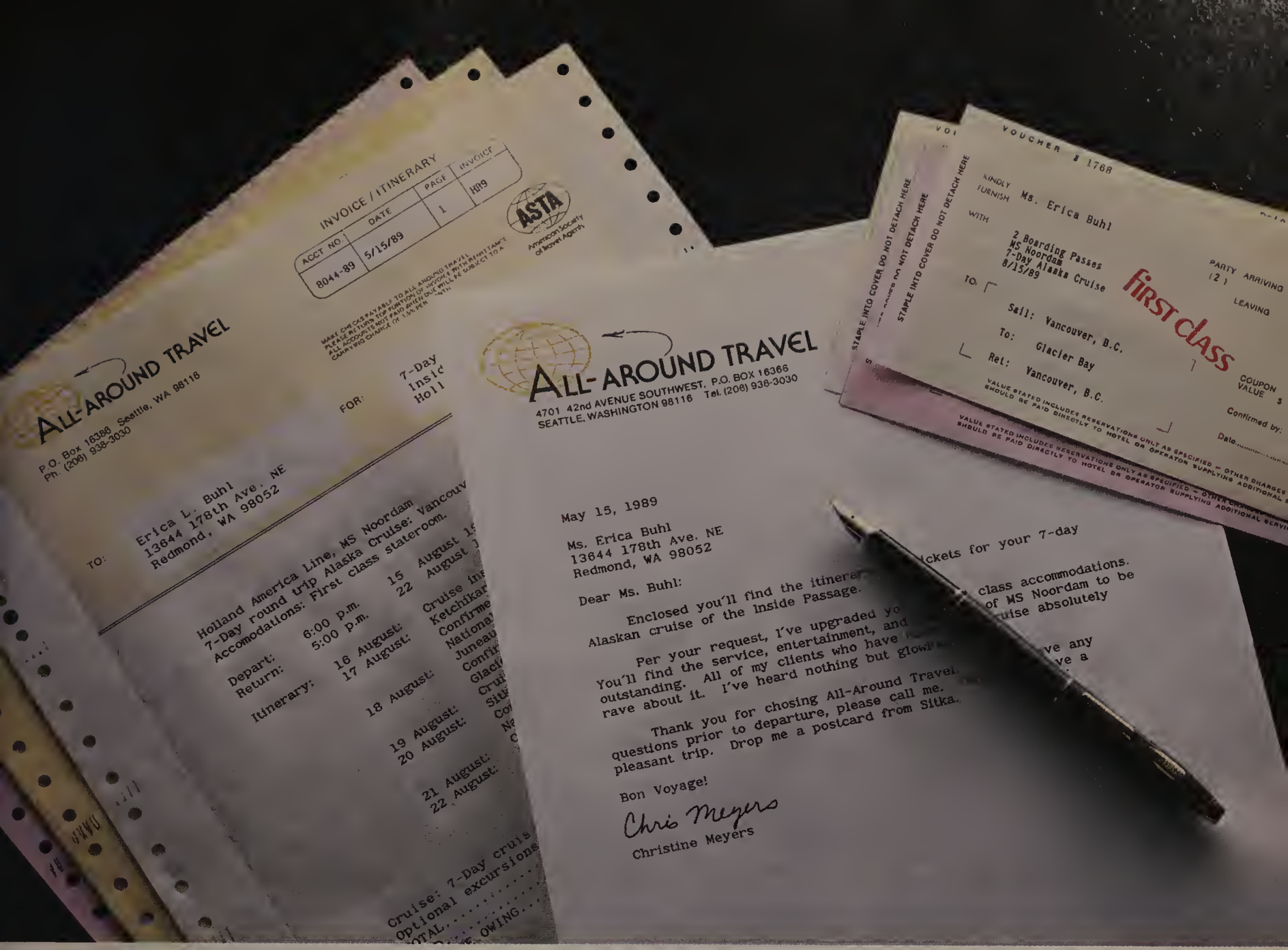
When you deal with more than one on-line communications service, it's helpful to assign commands to function keys so you can use the same keys for each service.

	Delphi	GEnie	CompuServe
STRAIGHT FUNCTION KEYS			
<F1> Log-off	BYE !	BYE !	BYE !
<F2> Help	HELP !	HELP !	HELP !
<F3> See who's on line	WHO !	U !	US !
<F4> Index or find	n/a	INDEX !	FIND !
<F5> Pause text display	^S	^S	^S
<F6> Resume text display	^Q	^Q	^Q
<F7> Display menu	MENU !	PRO !	n/a
<F8> Cancel/interrupt operation	^C	user choice	^C
<F9> Exit/move to previous menu	^Z	P !	M !
<F10> Move to top menu	GO !	TOP !	TOP !
<CTRL>-FUNCTION KEYS			
<Ctrl>-<F1> New mail directory	DIR !	1 !	n/a
<Ctrl>-<F2> Read mail	READ !	2 !	REA !
<Ctrl>-<F3> Reply to current mail	REP !	REP # !	REP !
<Ctrl>-<F4> Create mail	SEND !	SEND !	COM !
<Ctrl>-<F5> Delete current mail	DEL !	RELEASE !	DEL !
<Ctrl>-<F6> Read board message	REA !	REA !	REA !
<Ctrl>-<F7> Answer board message	REP !	REP !	REP !
<Ctrl>-<F8> Add new message to board	ADD !	STA !	COM !
<Ctrl>-<F9> Delete board message	DEL !	DEL !	DEL !
<Ctrl>-<F10> Exit (mail or board)	^Z	EXI !	M !
SHIFTED FUNCTION KEYS[1]			
<Shift>-<F1> File directory	DIR !	2 !	CAT !
<Shift>-<F2> Search	SEA !	3 !	BRO !
<Shift>-<F3> Copy file	COPY !	n/a	COP !
<Shift>-<F4> Rename file	REN !	n/a	REN !
<Shift>-<F5> Delete file	DEL !	7 !	DEL !
<Shift>-<F6> Display file on line	LIST !	L !	LIST !
<Shift>-<F7> ASCII upload	UP MENU !	5 !	UP !
<Shift>-<F8> ASCII download	DO MENU !	6 !	DOWN !
<Shift>-<F9> XMODEM upload	UP MENU !	5 !	UP !
<Shift>-<F10> XMODEM download	MENU !	6 !	DOWN !

[1] GEnie examples in this group apply to software librories only; Delphi and CampuServe examples apply to personal file areas.

Using Crosstalk's FKeys Command

To assign or change function keys for a given service, load its command file by typing the service's number from the list on the main menu. When *Crosstalk* begins the dial-up process, press **<Esc> <Esc>** to halt the script file and clear the command line.



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Crosstalk XVI ships with some function keys already assigned for most services. To display them, type **FK** (for Fkeys) at the command prompt. (To view <Ctrl>, <Shift>, and <Alt> commands, follow the FK with a space, and C, S, or A, respectively.)

Crosstalk XVI provides four special characters for use in function key assignments: ` issues a carriage return; ^ is a control character, displayed when you press the <Ctrl> key; ~ causes a 1-second pause; and @ sends local commands to *Crosstalk XVI*.

To make an assignment, type **FK** followed by a space, the number of the function key to be assigned, and the command sequence you want assigned to it.

To assign the BYE command to <F1>, for example, type **FK 1 BYE`** and press **<Enter>**. Control characters don't normally require a carriage return, so to assign ^S and ^Q (pause and start text commands on most services) to <F5> and <F6>, respectively, simply type **FK 5 <Ctrl>-S <Enter>** and **FK 6 <Ctrl>-Q <Enter>**.

To assign a command to a <Shift>, <Ctrl>, or <Alt>-function key combination, type **S**, **C**, or **A** followed by the function key's number. (Typing **FK S1** defines <Shift>-<F1>, for example.) To set up <Ctrl>-<F5> to issue Delphi's delete command, type **FK C5 Del`** and press **<Enter>**.

After you assign function keys for a given service, save the assignment in the service's command file by typing **Save** followed by the name of the file (the same name that you selected from the main menu): for example, Save Cserv.

The same steps also work in *Mirror I, II*, and—with some variation in command structure—*III*. *Crosstalk Mk.4* users can assign function keys by pressing **<Alt>-K** and entering the definitions in the window, using the syntax and special characters described here.

One final tip: It helps to cluster your commands by category. Assign the most often-used commands to straight function keys; those dealing with E-mail to <Ctrl>-function keys; miscellaneous commands to <Shift>-function keys; and local *Crosstalk XVI* commands to <Alt>-function keys. The result is a tailor-made front end that will make life simpler in a complex on-line world. —*Michael A. Banks*

Word Processing

Hassle-Free Fonts for WordStar

Downloadable soft fonts are easy to use with WordStar 5.0—once you learn how to install them.

What you need: downloadable soft fonts, Hewlett-Packard LaserJet or compatible

One of *WordStar 5.0*'s biggest advantages is the ease with which it lets you use HP LaserJet–compatible soft fonts, such as those sold by HP or Bitstream, to improve the quality of printed text. Not only does *WordStar 5.0* justify, center, and calculate line breaks for proportional type, it makes changing fonts (and mixing them on the page) a breeze.

Unfortunately, before you can use soft fonts you have to install them—a confusing three-stage process involving two standalone utilities provided with *WordStar 5.0*, LSRFONTS and PRCHANGE. First, you have to create a font information data base with LSRFONTS. Then PRCHANGE uses the data base to install the fonts in your laser printer driver (.PDF) file. Finally, you create a DOS batch file to download the fonts to the printer.

To begin, use DOS to copy the third-party fonts from disk to a subdirectory on your hard disk. Creating a FONTS subdirectory beneath your *WordStar* program directory (usually \WS5) is an obvious choice; for the purposes of this article, we'll assume that's what you've done.

Creating a Font Information Data Base With LSRFONTS

1. Run LSRFONTS. A screen will list the current directory (\WS5) and announce: 'Searching for LaserJet font files. Please wait...' Presently another message will appear: 'There are no font files in the current directory. Enter a new directory to search.' Type **C:\WS5\FONTS <Enter>**.

After a few seconds, the Available Third-Party Fonts screen will appear. You'll see a list of your font files on the upper half of the screen. On the lower half

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will be a series of headings: symbol set, point size, p/l (portrait or landscape orientation), pr/fx (proportional or fixed), and so on. As you cursor through the list at the top of the screen, the associated font attributes will appear at the bottom.

2. Press <Enter> to select (or deselect) the fonts. When you're done picking the ones you want, press <F10>. Remember, though, printer RAM limits the number of fonts your printer can handle. And the larger a font's size, the more RAM it uses.

3. You'll see a message that reads, 'Writing font information to database. Please wait...' Presently you'll be asked to name the "font group" for the data base. The name doesn't matter; you'll use it only once. The default name is a time/date stamp; to accept it, press <Enter>.

4. A message will announce the successful creation of the data base, and you'll be asked if you wish to exit the LSRFONTS program. Press Y to return to the DOS prompt.

Installing Fonts in WordStar With PRCHANGE

1. Run PRCHANGE. From the main menu, select 'Modify PDF settings', and press <Enter>. This will let you install the fonts in your printer driver.

2. You'll be asked to select a .PDF file to modify. Select your LaserJet driver by cursoring down to it and pressing <Enter>. Type in the directory where it is located (C:\WS5 is the usual choice), and press <Enter>. Now you'll see the PDF Modification menu.

3. Select 'Add or remove fonts', and press <Enter>. You'll see a list of all the fonts currently included in your .PDF file, and you'll be asked if you want to change them. Press Y.

4. Now you'll see a menu asking you to select the type of font to change. This part is tricky, because at least three options may seem pertinent. Be steadfast: Select 'Add or delete third-party laser fonts', and press <Enter>.

5. After a few seconds, a line will appear at the top of the screen: 'Add fonts (+), delete highlighted fonts (-), change associated fonts (enter).' Press +. The screen heading will change to Purchased Soft Fonts, but instead of a list of fonts (as in the previous screen), you'll see the name of the data base you created with LSRFONTS. Press <Enter> to select it, and then press <F10>.

6. Now you'll move to the Available Typefaces screen, which lists all the typefaces you included in the data base. You won't see pitch or orientation, just abbreviated names: Helv, Tms Rom, and so forth. Select the ones you want, and then press <F10>.

7. You'll find yourself in the Available Type Sizes screen. Available type sizes will be listed on the top half of the screen, with complete information (font group, width, proportional, orientation, and so on) listed below. Cursor to the type sizes you want, press <Enter> to select them, and when you're done press <F10>.

8. You'll return to the 'Select the type of font to change' menu. Select 'Return to previous menu', and press <Enter>. You'll be back in the PDF Modification menu.

Creating a Batch File to Download the Fonts

Now you've successfully installed the selected soft fonts in *WordStar*—but they won't do you any good unless you can get them into the printer at print time. That requires a DOS batch file, which you can create from within PRCHANGE.

1. Select 'Create download batch file' from the PDF Modification menu, and press <Enter>.

2. Enter a batch file name (such as DOWN.BAT) when prompted, and press <Enter> again.

3. Type in the name of the directory where your *WordStar* files are kept (C:\WS5) and the name of the directory where your font files are located (C:\WS5\FONTS), and press <F10>. The batch file will be created.

4. Select 'Return to Main menu', and press <Enter>. Select 'Quit and save changes', and press <Enter>. You will return to DOS. That's all there is to it.

The Payoff

To use your new soft fonts, run DOWN.BAT to load the fonts into the printer. Then run *WordStar 5.0* and open a file. To select a soft font, press <Ctrl>P=, and a menu will appear listing the fonts you've just installed. Cursor down to the one you want, and press <Enter>.

Now you can start typing your text. *WordStar* will handle justification, line breaks, and centering perfectly. If you change your mind later, simply change the font and press <Ctrl>-B to reformat the text correctly. Although the normal text-processing dis-

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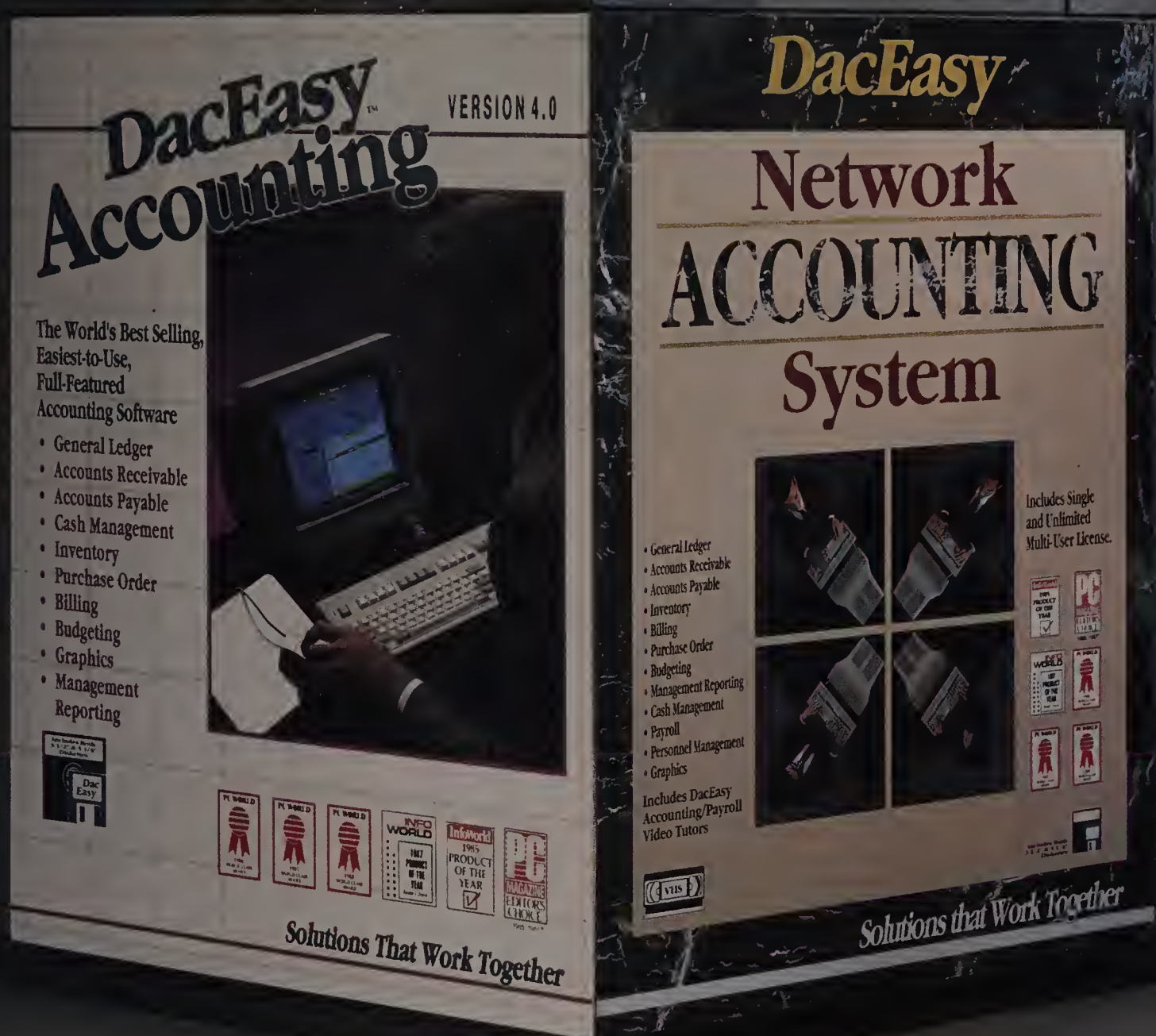

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play isn't WYSIWYG, you can use the preview option (<Ctrl>-OP) to see exactly how the final page will look. —*Michael Goodwin*

Data Management

Do-It-Yourself Clipper Functions

Create a simple user-defined Clipper function that lets you include pop-up menus in your data entry screens.

What you need: Clipper (any version)

More than just a *dBASE*-compatible compiler, Nantucket's *Clipper* is a hothouse for data base application development. With its strong support for user-defined functions (UDFs), *Clipper* lets you custom craft reusable tools that extend the dBASE language. These tools are particularly useful in customizing data entry screens.

UDFs are like any other function, except you create them yourself. A UDF is a program module that can be called by the main program from anywhere in a command line, followed by any parameters that must be passed to it. The UDF performs calculations or lookup tasks, for example, and then passes the results back to the procedure that called it, using the Return command.

LISTING 1 shows a simple UDF called CENTER() that centers a line of text. To call it from within a program, you would use:
? CENTER(*field_name*,85)

As with all UDFs, CENTER() starts with the Function command to identify itself, followed by a list of acceptable parameters. The first parameter, cstring, is the text string or statement that you want to center. The second, clenth, is the length of the line you want it centered in. Clenth is optional; without it, *Clipper* defaults to 80 columns. Next comes the Private command. It's always a good idea to use this command to make sure the UDF's variables don't corrupt the outside application.

CENTER()'s fourth line saves, to a variable called cblank, a number corresponding to half the width of the line minus half the length of the cstring text. Finally, the Return command inserts the appropriate number of blank spaces (cblank) followed by the text string (cstring).

Popping Up a Menu

Now for a more complex example. Say you're designing a data entry screen where, for one field, the user needs to select an entry from a pop-up menu. You don't want to hard code menu choices into the program, because nonprogrammers need to be able to change the choices easily. Instead, choices should reside in another data base file, indexed on the choices field.

LISTING 2 shows DBF_MENU(), a UDF that pops up a scrollable menu of choices from one field in an alternate data base. It returns the contents of that field for the record that the user selects. To add DBF_MENU to a program, you would embed a line of code such as CATEGORY; = DBF_MENU(12,45,23,67,; "MENU","CATEGORY",; "NEW_CAT","Pick One")

In the above example, the numbers are the coordinates of the corners of the menu box. MENU is the name of the alternate data base from which you're drawing the data, and CATEGORY is the name of the two data bases' common field. NEW_CAT is the name of another internal UDF you can call upon. Pick One is the title that appears at the top of the menu.

The PARAMETERS command in **LISTING 2** follows this structure. The first four parameters (*t*, *l*, *b*, and *r*) are the corners of the menu box (the numbers 12, 45, 23, and 67 in the above example). Base is the data base containing menu options. Mfield is the data bases' common field: In the original data base, it's the field to be replaced; in the menu data base, it's the list to be displayed. User_func is the name of an optional, internal

```
FUNCTION Center
PARAMETER cstring,clenth
PRIVATE cblank
cblank = IF(PCOUNT() = 1, 40, clenth/2)-;
(LEN(TRIM(cstring))/2)
RETURN SPACE(cblank) + cstring
```

LISTING 1: CENTER() is a simple Clipper user-defined function that centers a line of text on screen.

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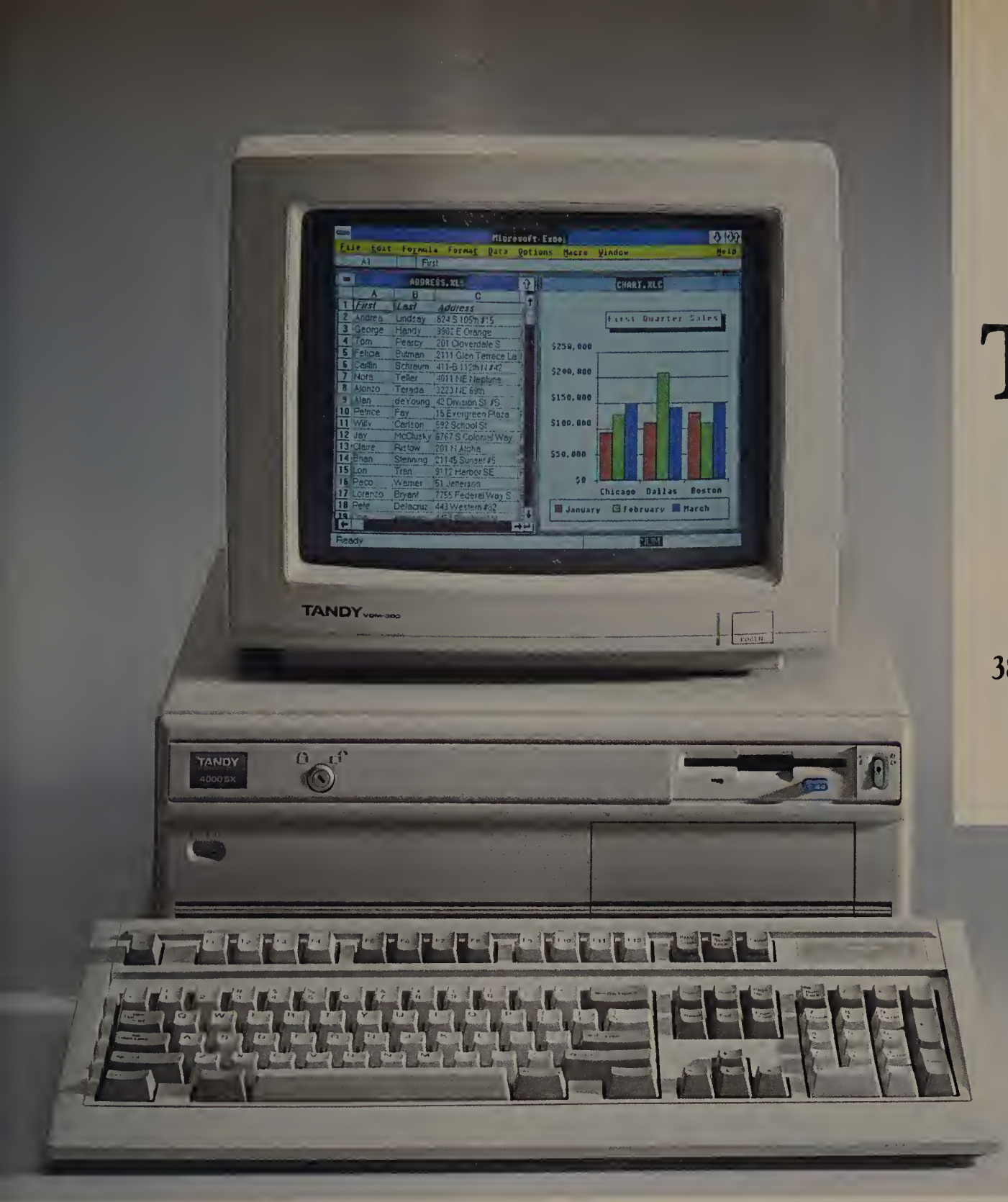

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```
FUNCTION Dbf_menu
PARAMETERS t,l,b,r,base,mfield,user_func,title
PRIVATE winbuf,orig_base
orig_base = alias()

*SET UP SCREEN
winbuf = SAVESCREEN(t,l,b,r) && Save text behind window
@ t,l CLEAR TO b,r           && Clear window area
@ t,l TO b,r                 && Draw box for window

*SET UP MENU
DECLARE column[1]            && Set up one field array
column[1] = mfield           && Place field in array
SELECT SELECT(base)          && Select menu database
SEEK &orig_base->&mfield     && Find record that matches
DBEDIT(t+1,l+1,b-1,r-1,column,user_func,0,title)

*RESTORE EVERYTHING
SELECT SELECT(orig_base)     && Go back to original database
RESTSCREEN(t,l,b,r,winbuf)   && Restore text behind window
RETURN &base->&mfield
```

LISTING 2: DBF_MENU() is a Clipper UDF that creates a pop-up menu for a data entry screen.

UDF that DBF_MENU() can call to perform other operations. If you don't want to call another UDF, assign a 0 to this parameter. Title is an optional title to be placed on the first line of the menu.

The second section of DBF_MENU() handles the physical design of the menu window. It saves the text that will sit behind the window to a variable called winbuf, clears the window area, and draws a box around it. Later, in the fourth and last section of the UDF, the original text will be restored to its place.

In the third section, DBF_MENU() makes use of a native *Clipper* function called DBEDIT(), which displays data in table format. By displaying only one field in one column, DBF_MENU() uses this table as a vertical menu. Because DBEDIT() lists data via arrays, DBF_MENU() must declare a one-element array containing the name of the mfield variable to be listed.

If you are going to use DBF_MENU() to help edit existing records, you will want its menu to pop up already pointing to the current selection. You could set a relationship between the two data bases, but such a relationship, existing in your application at large, beyond the protected world of your UDF, could prove problematic. It's better to use the SEEK command, which finds the record that matches the current record.

In this example, DBEDIT() functions as a command, allowing users to scroll through options. When the user presses <Enter>, DBF_MENU() returns the field contents for the selected record.

DBEDIT()'s behavior can be affected by an optional user-defined function passed to it as a parameter. DBF_MENU() sends the internal user_func UDF directly to DBEDIT() for that purpose. This allows you to include such features as the ability to add a new item to the menu or to abort the selection process. For more information on using internal UDFs, see the DBEDIT() section of the *Clipper* manual.

You could create similar UDFs for popping up notepad windows, producing custom menus, or enhancing calculated fields. A good personal library of user-defined functions can go a long way toward easing the task of *Clipper* development. —*Lincoln Spector*

USER GROUP TIPS

Helpful hints from members of the nation's user groups

A Batch File That Flicks Word's Switches

Microsoft Word 4.0's start-up switches offer handy options, like setting screen characteristics or reloading the last file you worked on. The simple batch file in **LISTING 1**, W.BAT, displays some of *Word*'s most helpful start-up switches and automates their use.

To create W.BAT, load *Word* and type the information shown in **LISTING 1**. Then name the file W.BAT and save it unformatted. Now whenever you type W at the DOS prompt, *Word* displays a handy list of switch options. The switches speed things up too—instead of typing WORD/L to reload the last file you worked on, for example, simply press W L <Enter>.

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```
echo off
IF %1x==x goto noparams
word /%1
goto end
:noparams
echo Use this file to load Word with a switch
echo Table of Batch File Switch entries
echo Enter   Switch name  Function
echo w                    displays this help screen
echo w c     Word/c       starts Word in character mode
echo w g     Word/g       starts Word in graphics mode
echo w l     Word/l       reloads last edited file
echo w h     Word/h       loads compressed character size
echo Multiple switches can be used in any reasonable
echo combination. For example, to load the last edited file
echo in graphics mode, enter w gl.
:end
```

LISTING 1: W.BAT automates loading Microsoft Word with display switches and provides an index of each switch's function.

```
SET TALK OFF
USE filename INDEX ndxname
SET ALTERNATE TO mergname.wp
SET ALTERNATE ON
GOTO TOP
DO WHILE .NOT. EOF()
    ?? firstnamefield
    ?? CHR(18) + CHR(10)
    ?? lastnamefield
    ?? CHR(18) + CHR(10)
    ?? addressfield
    ?? CHR(18) + CHR(10)
    ?? cityfield
    ?? CHR(18) + CHR(10)
    ?? statefield
    ?? CHR(18) + CHR(10)
    ?? zipfield
    ?? CHR(C5) + CHR(12)
    SKIP
ENDDO
SET ALTERNATE OFF
CLOSE ALTERNATE
```

LISTING 2: This dBASE III Plus routine automates file conversion for mail merges into WordPerfect.

Two cautionary notes: If your graphics card and monitor don't support high resolution, the /H switch may produce unreadable text. See *Word*'s reference manual for a complete list of displays supported by your graphics card.

Also, to load *Word* in default mode, or to load a file automatically from the DOS prompt, you must bypass W.BAT altogether. To load a file, type WORD *drive:\path\filename*.

Edward Spiess
Modesto PC User Group

Fast Recalcs for 1-2-3 Ranges

Using *1-2-3*'s Calc function to recalculate a range in a large spreadsheet can be time-consuming. For quick range recalcs when automatic recalculation is off, use the Copy command. Just select Copy and enter the relevant formula cells in both the Copy FROM and Copy TO ranges. When you press <Enter>, the program copies the range onto itself, recalculating all the included formulas in the process.

Frank Miyazaki
Borderline IBM-PC Users Group
Bellingham, Washington

WordPerfect Merges With dBASE III Plus

WordPerfect can't use standard *dBASE* files for mail merge. However, you can save *dBASE III Plus* data as an ASCII file, which *WordPerfect* can then import as a secondary merge file. The routine in **LISTING 2** simplifies the job by inserting *WordPerfect*'s secondary merge codes into a *dBASE* Alternate file, making translation a one-step process.

You have to insert the names of your own files and fields in **LISTING 2**. If you don't want certain records in the Alternate file, insert an IF...SKIP ENDIF statement directly after the DO WHILE line.

Now press <Ctrl>-<F9> to start the *WordPerfect* merge, and enter the name of the Alternate file at the secondary merge file prompt.

Milt Hull
Sacramento Personal Computer Users Group

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Michael Goodwin is an associate editor for PC World. *George Campbell is a columnist for* Compute's PC Magazine; *he lives in Los Osos, California. Michael Banks is a telecommunications and science fiction writer and the author of* The Modem Reference *(Brady Books, New York City, 1988). Lincoln Spector writes and edits newsletters and publications for 800-Software and writes a humor column for* Computer Currents.

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Anita Amirrezvani

The Radiation Enigma

Controversy has raged for years over whether the low-frequency radiation emitted from computer monitors poses a risk to health. The concern stems from reports of more than a dozen clusters of miscarriages and defective births among workers who used computers during pregnancy. Research into the effects of low-frequency radiation on mice and chick embryos has also produced disturbing, though controversial, results.

In 1988, a study published by the Kaiser Permanente Medical Care Program in California added fuel to the fire. In the study, women who used video display terminals (VDTs) more than 20 hours per week during the first trimester of pregnancy were 80 percent more likely to lose their babies through spontaneous abortion than women who did not use VDTs.

But the link between VDTs and pregnancy problems remains uncertain. Dr. Robert Hiatt, coauthor of the Kaiser study, says that the miscarriages may have been caused by stress or poorly designed workstations rather than electromagnetic radiation.

And there's the problem in a nutshell: While ionizing radiation such as X rays is known to be dangerous, no one seems to know for sure whether the nonionizing, low-frequency radiation emitted by computer monitors is harmful. Nor is it clear whether the duration or intensity of exposure makes a difference. Add to this the fact that 12 to 15 percent of recognized pregnancies end in miscarriage anyway, and you have a recipe for doubt. This uncertainty has created a storm of controversy over what should be done now, while further research is under way.

"As a policymaker, I would say that there's insufficient evidence to warrant changes in regulations," says Dr. Hiatt. "As a physician, if a patient who had had several miscarriages came to me, I would say go ahead and transfer to another job for a while."

Industry trade groups, such as the Computer Business and Equipment Manufacturers' Association (CBEMA), say that fear is unwarranted. "All we know now is that there's no conclusive data, and it looks like there's no harm done," says Maryann Karinch, manager of communications at CBEMA.

But many workers' groups say that they'd rather be safe than sorry. "By and large, people who say the information is inconclusive say that we should do nothing," says Sharon Danaan, research director for 9 to 5, a group representing 14,000 clerical workers. "We say research is very slow, so why not take simple precautionary steps?"

Unions such as the Communications Workers of America and the Service Employees International Union (SEIU) have negotiated a number of contracts that include clauses allowing pregnant women the option of transferring to noncomputer work.

But according to SEIU lobbyist Kathy Skrabut, such transfer rights are hard to win. "The nature of clerical work these days, especially in data processing, is single task–oriented," she explains. "We find the worst abuses in the insurance and airline industries, where a reassignment for a pregnant employee just

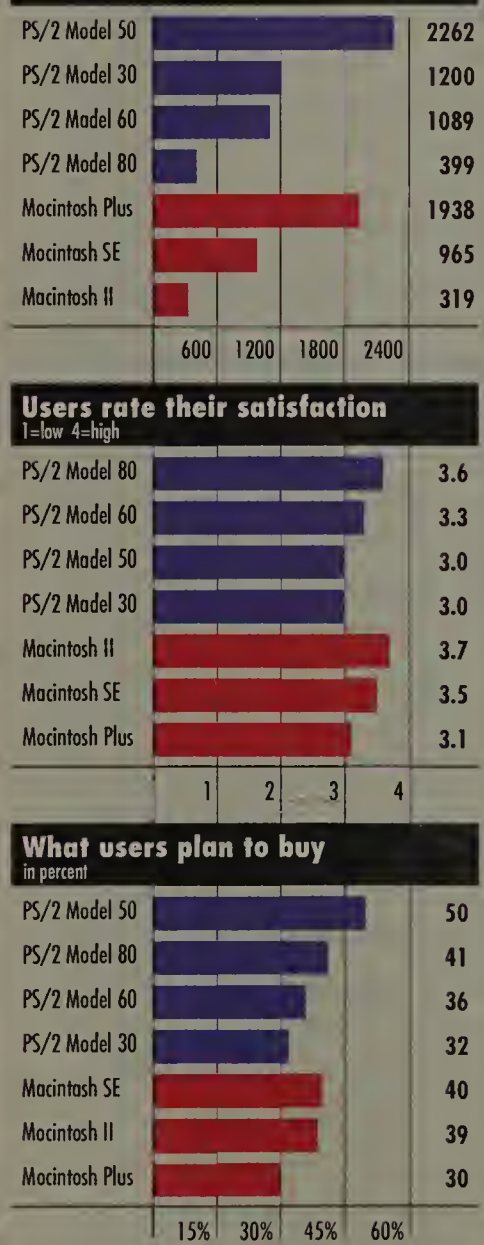
(continues)

ANTHONY RUSSO

RATE YOUR SATISFACTION: Apple Dogs IBM

Of the 180 large organizations surveyed here, fully 44 percent have added the Apple Macintosh to their approved products list. The main reasons? Graphics capabilities, ease of use, and user requests.

Although the installed base of PS/2s is larger, the Macintoshes score just as well in user satisfaction. Not surprisingly, the Model 80 and the Macintosh II rate the highest.



Source: International Data Corporation. From a survey conducted in December 1988 of 180 sites, each with at least 50 PCs.

boils down to more computer work."

Many workplaces don't even offer this luxury. IBM, for example, has no policy for transferring pregnant workers to other jobs. "If a female employee requests a transfer, every effort would be made to assure her of her safety," says IBM spokesperson Theo Chisholm. "If she still requests a transfer, the question of alternate work assignments would be handled between her and her supervisor."

Avoiding the Rays

Given the uncertainty of the research, it's no wonder there's little consensus about what to do. For managers who want to protect their employees from possible low-frequency radiation dangers, one much-publicized option is to invest in products (such as shields) that claim to reduce the radiation emitted from computer monitors. But choosing among these products is more difficult than it sounds.

That's partly because computer monitors emit two types of radiation: electric field (E field) and magnetic field (H field), and no one is certain whether one type is more dangerous than the other. "The feeling is that if there's a negative effect, it's more likely to result from the magnetic field, but that's not firmly established," says Dr. Michele Marcus, a specialist in environmental and occupational hazards at New York's Mount Sinai School of Medicine.

Not a single monitor shield on the market completely suppresses both types of radiation, according to industry experts. Companies such as Kantek (212/925-7850) and NoRad (800/262-3260) make shields that they claim will suppress all of the E field but only part of the H field. Acco International (800/222-6462) and Sun-Flex (800/321-1659) both make shields that block only the E field. Other companies, like I-Protect (213/215-1664), produce shields that aren't designed to block low-frequency radiation at all—instead, they claim to block X rays, which already require shielding under federal law. Even more confusing, some shields simply block glare or discharge static via a ground wire but don't offer protection from anything else.

Instead of buying a shield, concerned consumers might consider a flat-screen LCD monitor offered by Safe Computing (800/222-3003). Executive Vice President Allen Nitschelm claims that the $995 monitor blocks both E-field and H-field emissions.

Before buying any radiation-shielding product, however, consumers should investigate it carefully. In what is clearly a warning to consumers, most of the manufacturers contacted for this article complained that their competitors deliberately mislead consumers about the capabilities of their products. Industry expert Louis Slesin, who publishes *VDT News*, says that "there's a lot of loose talk" about what shields can do. To avoid low-frequency radiation from monitors altogether, taking a break from computer work might be the safest solution.

SHOP TALK

Good Printers Gathering Dust

Some years ago I was responsible for a decision that has really come back to haunt me. After careful review of available dot matrix printers, I recommended the purchase of four Toshiba

(continues)

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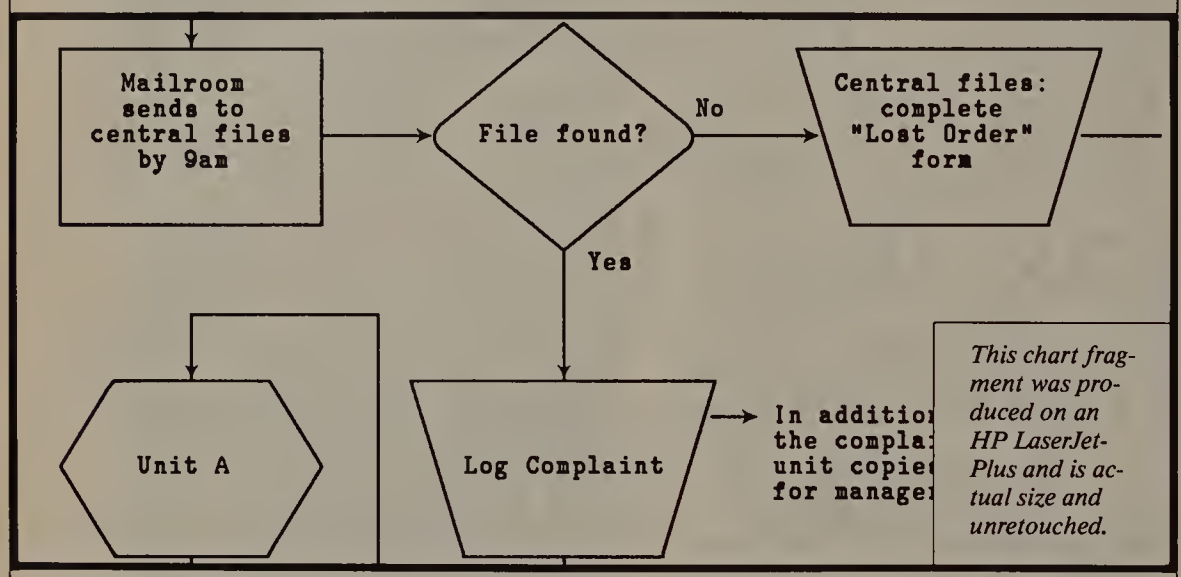

This chart fragment was produced on an HP LaserJet-Plus and is actual size and unretouched.

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Thousand Island Park, NY 13692

Order Desk: 1-800-267-0668
Information: (613) 544-6035 ext.47
Telefax(G3): (613) 544-9632

Circle 79 on reader service card

P351s. These printers provided excellent service for well over a year before one totally failed. Not being in a major metropolitan area, we shipped the printer directly to Toshiba for repair. Three months later, I discovered that Toshiba had neither repaired nor returned the printer because the company would not honor our purchase order, even though it more than amply covered the cost of repair. We either had to accept COD shipment or fill out a credit form. To make a long story short, the credit check took seven months.

It was all downhill from there. In June 1988, three of the Toshibas failed. From past experience, we avoided Toshiba and went to a local authorized repair center. The printers were returned after a month, unrepaired. We decided to try another repair shop recommended to us, in Illinois. The printers were shipped in October 1988, and as of February 1989, we still hadn't received them back. We were told that all three had the same problem. Toshiba had advised the repair center that the necessary parts were unavailable, and there would be a six-month wait!

Eugene T. Duffy
Killeen, Texas

Toshiba America responds: Toshiba has improved its user support and service in the last several months with an automated 800 phone line to reduce call-waiting time; implementation of a computerized repair center for up-to-the-minute data tracking and reporting; and improved procedures for material control, forecasting, warehouse control, receiving, and distribution.

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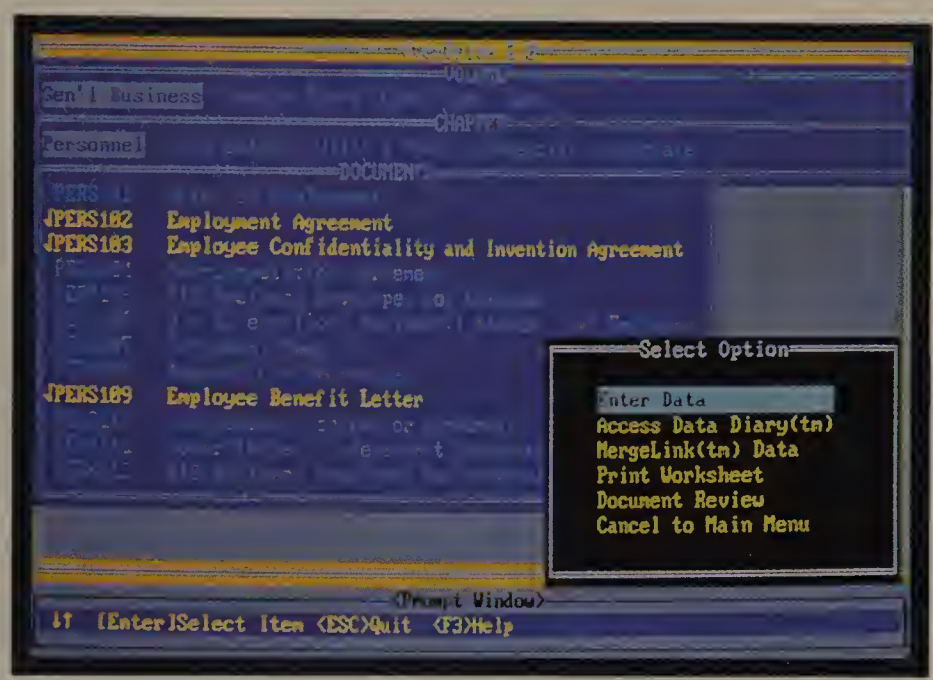

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Circle 202 on reader service card

Any Toshiba customer who faces service problems should call these numbers: field service 800/624-5932; printer/PC product support 800/433-5999; laser printer support/service 800/448-LASR or 800/848-LASR.

Mark Fritz
Director, Field Service

Guarantee With a Twist?

My wife bought me *Beyond Word Writer*, a word processor by Timeworks, for my birthday. The back of the package says: "Moneyback guarantee. If you can find anything that works better for you, simply send us your Beyond Word Writer, your paid receipt, and the name of the program you want, along with your check or credit card number for any retail price difference. If it's available, we'll buy it for you."

When I called Timeworks three days later to return the program, I was told that since I didn't purchase the product directly from the company, there was no guarantee.

Richard DeFilippo
Bloomfield, New Jersey

Timeworks responds: I was quite distressed by the misinformation Mr. DeFilippo received. The Timeworks guarantee is exactly as he quoted. All he has to do is send us the program, his receipt, and a check for the difference in retail price.

Ellen Adler
Director, Customer Support Services

Editor's note: We don't think this guarantee is very generous. Although Timeworks' policy is to provide a credit at the store where the program is purchased, customer service director Adler says that the company will provide a cash refund only if the program was purchased directly from Timeworks. Worse yet, Timeworks purchases new products for dissatisfied users only at their full retail price. *That's hardly an advantage.*

Take action! If you've got a complaint or a compliment, send it to Consumer Watch. We'll follow up and publish letters with the broadest interest. For more information, see How to Contact PC World, page 4.

Q.

"Where Do I Turn For More Information?"

A.

1. Turn to the Reader Service Card at the back of this issue of *PC World*.
2. Find the Reader Service number of the product you want in the product or advertiser indexes.
3. Circle the number, fill out the postage-paid card and send it in. It's that simple.

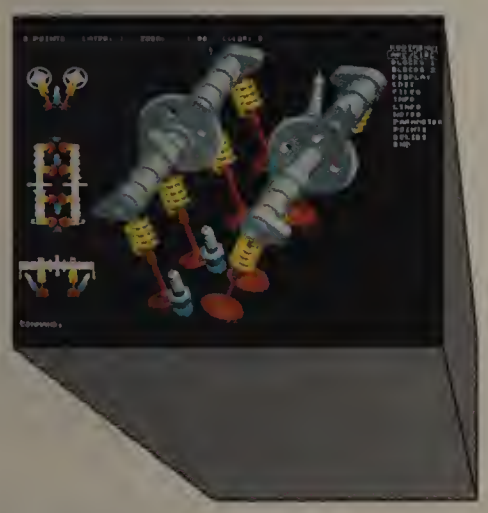
In return, our advertisers will send you more information on the products you want. It's just another way that *PC World* helps you make the best buying decisions for your company.

PC WORLD

Aw . . . What the Heck!

EXTREMELY POWERFUL

DesignCAD 3-D version 2.0 is as powerful as most CAD systems costing $5000 - $10,000! Features like: Complex Extrusions-linear, scaler, and circular, Blending of Surfaces, Shading, Cross Sectioning, Complex Sweeps and Translations, and Boolean operations make DesignCAD 3-D one of the most powerful 3-D CAD systems available . . . at any price! Engineers, Architects and Consultants constantly tell us that they use CAD systems costing thousands of dollars which are not as powerful as DesignCAD 3-D.



VERY EASY TO USE

Just because DesignCAD 3-D is powerful doesn't mean it is difficult to use. Single keystroke commands and side-bar menus which give short directions on how to proceed make DesignCAD 3-D a snap to use! While not required, DesignCAD 3-D supports all popular digitizers and mice.

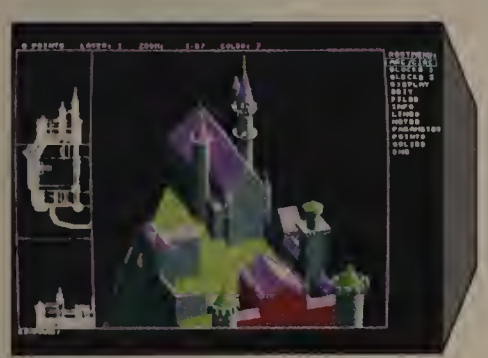
Many of the older, more cumbersome CAD systems require weeks of training before a user can be productive. DesignCAD 3-D users find they can be producing useful drawings in a matter of minutes! In a recent CAD contest only one contestant was able to match our drawing time. The package sold for $3000.00. The other CAD packages took up to twice as long to perform the same drawing and cost up to $5000.00!

Still don't believe us? The goblet pictured below required only 16 keystrokes and 3 commands to create! The top, front, side, and isometric views were created simultaneously . . . in less than one minute!

VERY LOW PRICED

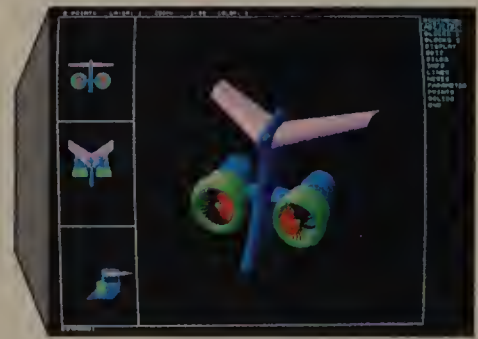
The first question asked by many people is, "Why is DesignCAD 3-D priced so low?" The answer? After developing DesignCAD 3-D version 2.0, we were unable to decide how the product should be priced. We consulted experts. We used the finest spreadsheets on the market. We took employee polls. Finally, in the great American Tradition, we said, *"Aw . . . What the Heck! Let's see the other guys beat this price!"* DesignCAD 3-D version 2.0 sells for $399.

DesignCAD 3-D only $399!



WHY BUY THIS ONE?

There is a very important reason to buy DesignCAD 3-D. PERFORMANCE. No other CAD system can match our price/performance ratio. Many people make the serious mistake of thinking that it is necessary to spend thousands of dollars to obtain "a good 3-D CAD system." This is not true! We talk to people everyday that are sadly disappointed with their "expensive" CAD systems. Don't be one of them! Call us and we will send you a complete set of literature and a free slide show demo disk. Once you compare DesignCAD 3-D version 2.0 with other CAD systems we know you will choose DesignCAD 3-D.



DON'T TAKE OUR WORD FOR IT

Here is what other people have to say about DesignCAD 3-D:

"After you've worked with DesignCAD, the single keystroke commands are simple to remember and it becomes easy to "flick one key" to execute a command. An extremely ergonomically designed program."

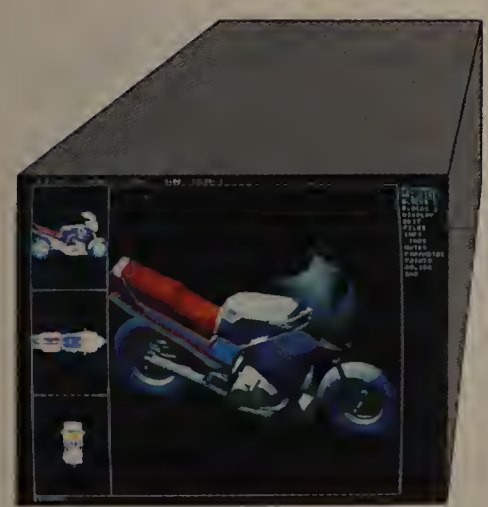
HENRY LEVET, Levet & Daigle Architects - New Orleans, LA
Designed a 65,000 sq. ft. nursing home using DesignCAD

"Recently I worked with a firm that builds decks. They purchased your product on my recommendation. I sat down with them and in two hours they were very proficient in DesignCAD. Now they are more effective; and we can communicate . . . it's wonderful to be able to do a block repeat 42 times and there are 42 2x4's to make the deck!"

J. TURNER, Architect, TAO Ltd. - The Woodlands, Texas

"Allows scientists and engineers to expend minimum time learning and using CAD software so that their time can be expended on the project at hand. It also allows scientists and engineers to quickly present to management all views of a subject. (3-D)."

DR. STEVENS, NASA Space Scientist/Engineer



HOW DO I GET ONE?

DesignCAD 3-D version 2.0 is available from most retail computer stores, or you may order directly from us. DesignCAD 3-D is available in a number of foreign languages from distributors throughout the world. All you need to run DesignCAD 3-D is an IBM PC Compatible and 640K RAM. DesignCAD 3-D supports most graphics cards, printers, plotters and digitizers. Free information and a demo diskette are available by contacting us at:

American
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THE UPGRADE PATH

Hands-on advice for upgrading PCs, compatibles, and peripherals

A versatile keyboard for PCs and ATs, an immortal system battery for 286 and 386 computers, and a full-page monitor for $99

Robert Luhn

Two Keyboards In One

In the West, where freedom is often equated with choice, there's no freer world than the PC world, where thousands of vendors offer every conceivable variation on a given theme. Consider the keyboard. Hate its mushy touch? Want a True Blue AT layout (circa 1984)? Need more keys? In the PC world, anything is possible.

But before you pick up that phone to call Key Tronic, the leader in alternative keyboards, consider Northgate's solid OmniKey/102 for only $99. It's as tough as the reliable old IBM PC keyboard, sports 12 function keys on the left, places the <Ctrl> key directly to the left of the ASDF keys (praise be!), and features a fat IBM AT–style <Enter> key. The OmniKey also includes contemporary extras, from a separate cursor pad and a <Pause> key to duplicate <Enter>, <Ctrl>, and / keys. A welcome bonus: Flip a switch on the back, and the keyboard can work with either PCs and XTs or ATs and 386s. The company also offers the *OmniCruise* keyboard accelerator for $7.95 and a $25 adapter for IBM PS/2s.

Northgate's user manual is painstakingly precise, although it fails to note that the keyboard's X/A switch configures it for XT or AT computers, respectively. No matter. Adding the OmniKey to your system is a snap. Turn off your PC, plug in the OmniKey keyboard, set the X/A switch, turn the computer on, and you're in business. If the system beeps or displays a keyboard error, chances are you set the switch incorrectly. Turn off the PC, flip the switch in the opposite position, and turn the PC back on.

Like most replacement keyboards, the OmniKey may have trouble with older 80286 compatibles originally designed with 84-key keyboards in mind. For example, scrolling on an NCR PC8 is a bit jittery, and the OmniKey's <F11> and <F12> keys aren't recognized by macro processors such as *Keyworks*. Northgate acknowledges that some original 8088 PCs—notably from Zenith, Tandy, and Dell (formerly PC's Limited)—may balk at the OmniKey altogether. Although that's hardly Northgate's fault, the company nevertheless offers a 10-day, no-questions-asked return policy. Now that's the *only* way to upgrade.

WHERE TO BUY

OmniKey/102
Northgate Computer Systems
13895 Industrial Park Blvd. #110
Plymouth, MN 55441
800/526-2246
LIST PRICE: $99, PS/2 adapter $25, OmniCruise $7.95
WARRANTY: three years parts and labor
EXTENDED WARRANTY: none
TECHNICAL SUPPORT: unlimited, no toll-free number, M–F 8–5
OTHER SUPPORT: none
Reader service no. 685

The Last System Battery

In the year 3 B.A. (Before AT), PC and XT users had to reset DIP switches every time they changed monitors or added a new disk drive to their systems. Then along came the AT, and with it, the revolutionary concept of storing system setup information in a battery-powered CMOS chip on the motherboard. The only problem? The lithium

(continues)

ANTHONY RUSSO

battery that keeps the data "alive" in the chip eventually dies, taking the setup information with it. You have to not only put in a new battery (which will die 2 or 3 years down the line) but boot the computer with a floppy system disk (since the hard disk is no longer recognized), and run the AT's Setup program again.

You can end this ritual for a not-so-paltry $49.95 with the Last-Bat, a rechargeable system battery from Accumation. The company claims that the Last-Bat will probably outlast your computer and accordingly offers a lifetime warranty. So maybe $49.95 is a deal after all.

Replacing the old system battery with the Last-Bat takes only 15 minutes, in spite of a user manual that omits detailed steps. The tools of the upgrade: a screwdriver to remove the computer's lid, and a flashlight. Park the system's hard disk, turn the system off, unplug all external cables, ground yourself properly, and remove the cover. Locate the system battery at the back of the computer. On most ATs and 386s it's a 1-inch-square black or gray box mounted on the inside of the backplane above the keyboard connector. Remove the battery's motherboard connector, then pluck the battery from its perch. (If the battery is built into the motherboard, make sure the battery is removed or the Last-Bat won't work.)

Installing the Last-Bat means reversing this process, with one key difference. Since the Last-Bat recharges when your machine is on, it must naturally tap into the computer's power supply. Take one of the power supply's white female connectors and mate it with the Last-Bat's matching male connector. (If there are no free power supply connectors, don't fret. Pull out the floppy disk drive's power cable, plug it into the Last-Bat, and plug the Last-Bat's special power connector into the disk drive.)

At this point, you'd expect to peel the paper off the Last-Bat's adhesive backing and stick it inside the system case just above the keyboard connector. But the Last-Bat is twice as big as most system batteries and may prevent the system cover from sliding shut if it's placed too high on the case. Make sure there is proper clearance, mount the Last-Bat, and then replace the cover. Although the manual correctly warns you not to stick the Last-Bat onto anything hot, the accompanying illustration wrongly shows it secured to the computer's power supply! Ignore the drawing and follow the manual's written instructions.

Reassemble the system, turn it on, and you now have a lifetime system battery. If you're buying the Last-Bat because your system battery recently expired, you'll naturally have to run your Setup program one last time—at least until the next upgrade.

WHERE TO BUY

Last-Bat
Accumation, Inc.
8817 Southwest 129 Terr.
Miami, FL 33176
305/238-1034
LIST PRICE: $49.95
WARRANTY: lifetime warranty to original owners, including shipping
REQUIREMENTS: IBM PC AT, Compaq Deskpro 286 or 386, or compatible
TECHNICAL SUPPORT: unlimited, no toll-free number, M–F 10–6
OTHER SUPPORT: none
Reader service no. 686

Full-Page Monitor on a Disk

Back in September 1987 I examined a clever little video enhancement board from Aristocad called the Kicker. By plugging the Kicker into an EGA board driving a multiscan monitor, you instantly doubled *Ventura*'s displayed page length. The downside? The Kicker cost $195, was hell to configure, and worked with only multiscan monitors.

This time around, Aristocad has not only cut the price, it's automated the installation; added *Microsoft Windows/286* to the fold; and embraced almost all EGA, VGA, and multiscan setups. Better yet, you don't need to open up the back of your computer: The Kicker has become *The Soft Kicker*, a $99 program that largely matches the Kicker's talents and adds some new features to boot.

Aside from giving you full-page display (instead of the one-third most of us live with), *The Software Kicker* offers *Ventura* users panning (speedily displaying any part of a page without redrawing the screen or fussing with scroll bars), an on-screen magnifying glass, and a full-page view at the click of a mouse. An extra $40 buys you *The Soft Kicker Plus*, which gives *Windows/286* users panning and a full-page, 1024-by-1024-pixel black-and-white display.

Installing *The Soft Kicker* for *Ventura* is painless. Pop the disk into drive A:, type Install, and answer a few prompts about your video setup. When you first load *Ventura*, you can't see any menus. But roll the pointer to the top of the screen and the top

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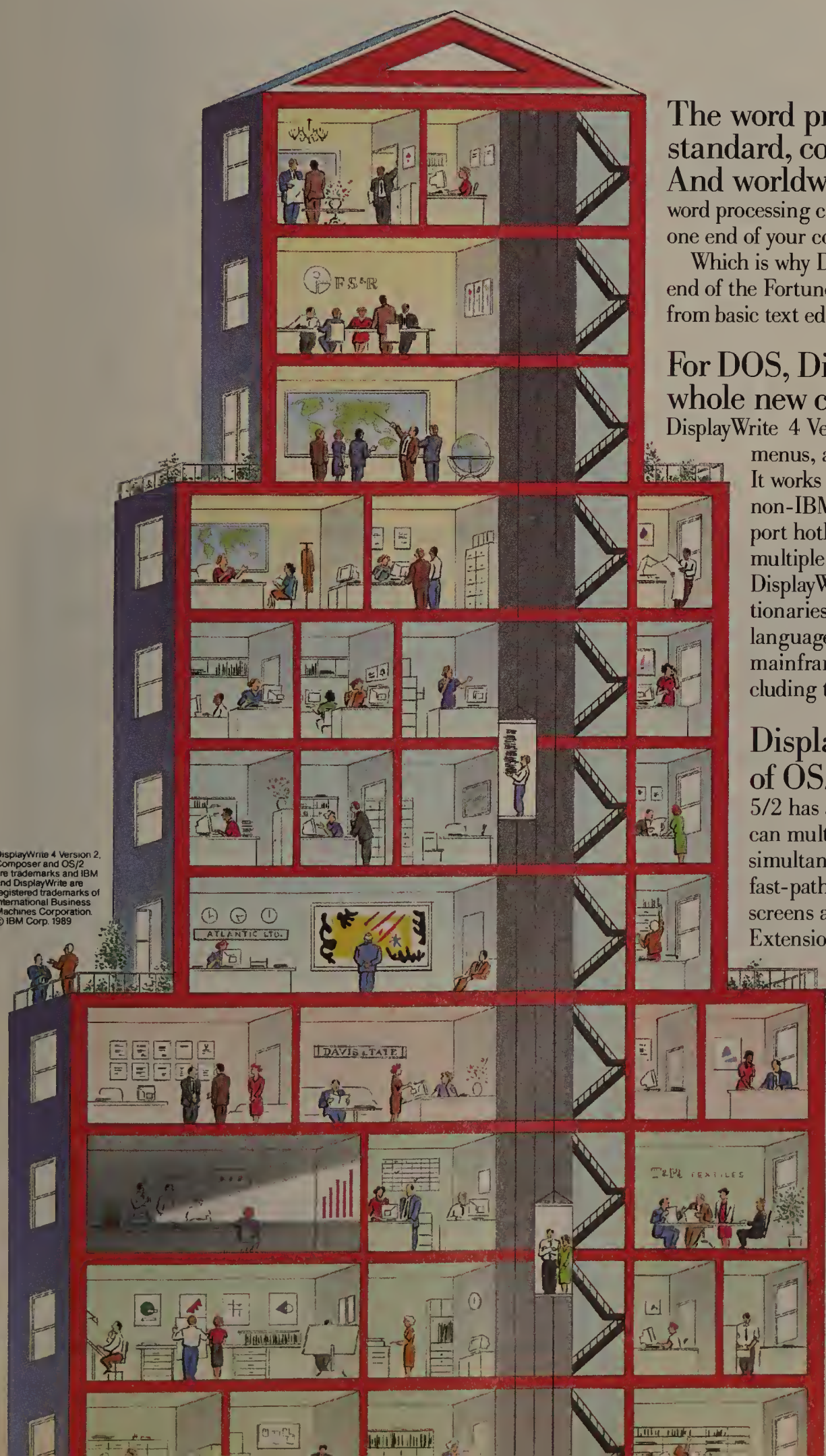

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of the page quickly flows into view. Click the right mouse button and the entire page is displayed (three-quarters of a page on an EGA setup), along with a magnifying glass linked to the pointer. You can perform any operation in this sky-high view, then zoom back to any place on the page by clicking the mouse again.

Installing *The Soft Kicker Plus* for *Windows/286*, however, is a pain because you must reinstall *Windows* from scratch. (For tips on how to partially reinstall *Windows*, see this month's *Help Screen*). Since this Microsoft-ordained process will write over existing system files, copy your current WIN.INI and .PIF files to a different subdirectory before you start. Then run *Windows/286's* Setup program. When you're asked to specify your display adapter, pick Other, slip the *The Soft Kicker Plus* disk into drive A:, and pick the appropriate 1024-by-1024 black-and-white EGA or VGA driver, or one of the color drivers aimed at *Excel*, *Micrografx Designer*, and *PageMaker* users.

The Soft Kicker is a perfect upgrade for *Ventura* users. But you might think twice about *Plus*—it's too expensive, doesn't support *Windows/386*, and lacks a magnifier. However, keep an eye peeled for Aristocad's forthcoming *Excel More*, which does for *Excel* what *The Soft Kicker* does for *Ventura*.

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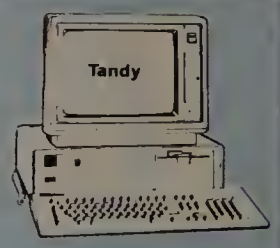

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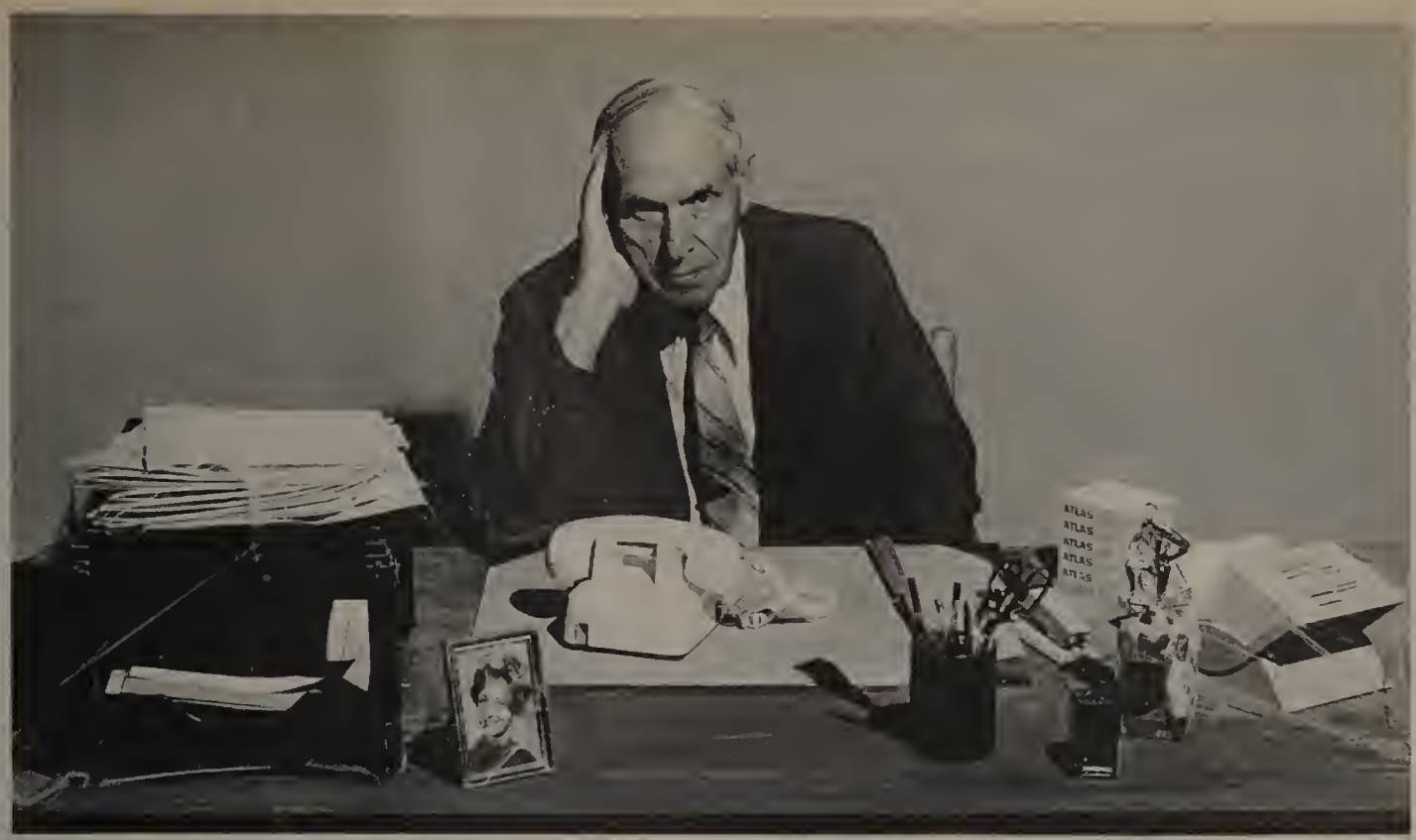

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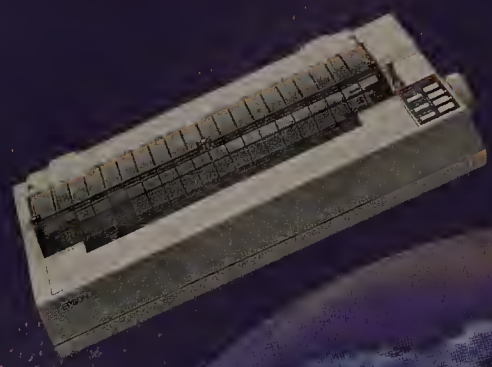

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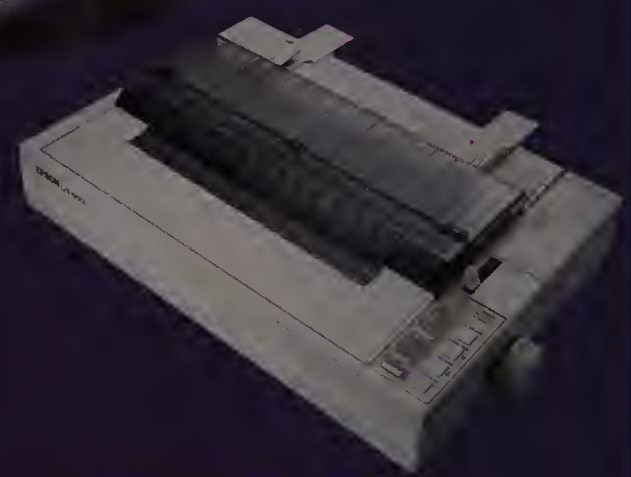

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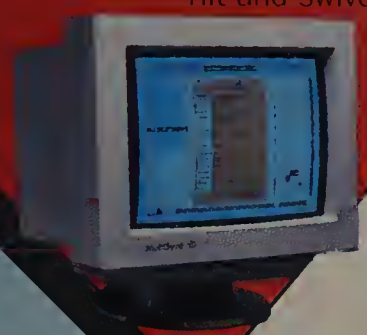

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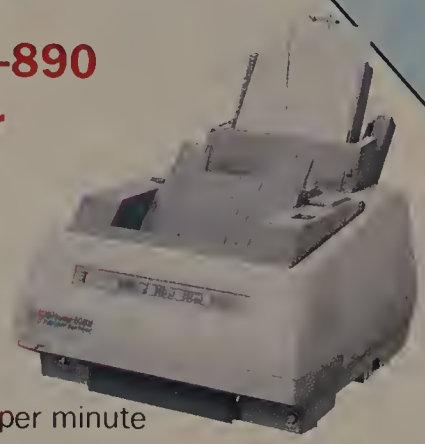

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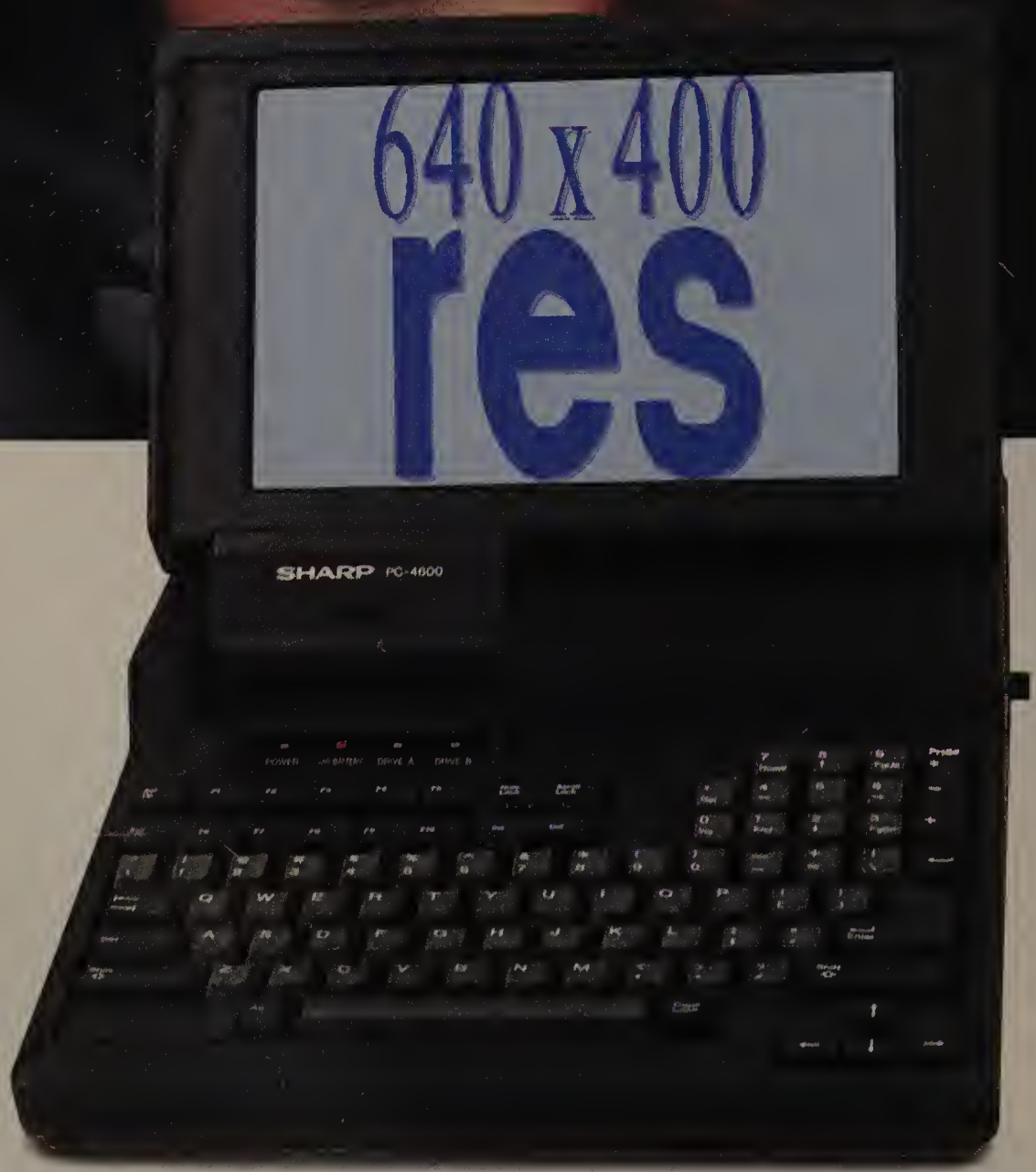

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Edited by Tom Swan

Merging From dBASE to Word

I prefer to use *dBASE III* to prepare data files for *Microsoft Word* Print Merge operations. This eliminates data entry errors when merging fields that contain commas (as in Mr. John Doe, Jr.) because *dBASE* can automatically place double quotes around individual fields—a tedious job to do by hand. After using *dBASE II* to create a .DBF file containing the names and addresses, I create the merge data file with a simple one-line command at the dot prompt:

COPY TO DELIM.TXT DELIMITED WITH "

To use the result in a *Word* Print Merge, add a line at the top of DELIM.TXT that lists, in the order in which they appear, the names of the fields embedded in your form letter or other merge document. Separate the field names with commas, and end the line with a carriage return.

Jon M. Stewart
Palm Desert, California

FINDing the Date and Time

Like Bob Farland ["Booting Around the Clock," *Star-Dot-Star, PCW,* May 1989], I wanted my AUTOEXEC.BAT file to display the current date and time while skipping the 'Enter new...' prompts. I found a combination of the ECHO, DATE, and FIND commands that accomplishes this without requiring you to install ANSI.SYS or create a permanent file containing a carriage return and linefeed. If you're running DOS 3.0 or a later version, add these two lines to AUTOEXEC.BAT:

```
ECHO. | DATE | FIND "C"
ECHO. | TIME | FIND "C"
```

Make sure that FIND.EXE is on your boot disk or in a directory included in a preceding PATH statement. The ECHO. command issues a carriage return and linefeed, which the pipe operator (|) transfers to the DATE and TIME commands' 'Enter new...' prompt. The latter commands' output is then piped to FIND, which displays only the line containing "C", with this result:

```
Current date is Mon 5-10-1989
Current time is 11:22:46.12
```

If you're still using DOS 2.0 or 2.1 (in which ECHO. doesn't return a blank line), you can use an alternative command that's only slightly slower:

```
ECHO | MORE | DATE | FIND "C"
ECHO | MORE | TIME | FIND "C"
```

One final note: If you try any of these tips on a floppy disk, uncover the write-protect notch. When DOS encounters piped commands, it must create temporary files on the current drive.

Alan Wachtel
Mountain View, California

WordStar Macro Symbology

I often need to type the plus/minus (±) and degree (°) symbols using *WordStar 4.0*, so I made two macros to automate the task.

To create the macros, press **<Esc>** to bring up *WordStar*'s shorthand menu. Then type **?PPlus/Minus** and press **<Enter>**. Hold down the **<Alt>** key while you type **241** on the numeric keypad, and then release the <Alt> key. Press **<Enter>**. Next, type **DDegree** and press **<Enter>**. Hold down the **<Alt>** key while you type **248** on the numeric keypad, and then release the <Alt> key.

(continues)

ANTHONY RUSSO

Finally, press **<Enter> <Enter> Y**.

You can use a similar technique to create macros for other symbols in the extended ASCII character set, listed in most DOS manuals. However, your printer may not reproduce the same symbols on paper—check your printer's documentation to be sure.

Robert S. Stein
Los Altos, California

Editor's note: Some printers may require you to change some switch settings to enable extended ASCII characters. Also, if you are using WordStar 5.0 *with pulldown menus enabled, select the Other/Shorthand Macros command instead of pressing <Esc>. Then, enter the macro keystrokes.*

dBASE Name Games

Recently I had to print out checks from a *dBASE* data base holding nearly 700 names. In examining the file structure, I noticed that all the names were listed last name first, as in, "Marschand, Steven E." Since I didn't relish retyping 700 names, I wrote a program to reverse the last and first names. After processing a copy of my data base, it was a simple matter to print the checks.

REVERSE.PRG [see **LISTING 1**] uses the AT() function to locate a space between the first and last names. After this, other string functions such as RIGHT() and SUBSTR() separate the two names. Then, STORE, TRIM(), and REPLACE commands remove the comma and reassemble the NAME field in the correct order.

Steven Marschand
Kokomo, Indiana

```
SET TALK OFF
SET ECHO OFF
GO TOP
CLEAR
@ 8, 25 TO 12, 47 DOUBLE
@ 9, 29 SAY "Separating Names"
@ 11, 29 SAY "Please Stand By"
DO WHILE .NOT. EOF()
    STORE NAME TO TNAME
    STORE LEN(TNAME) TO A
    STORE AT(" ",TNAME) TO B
    STORE A-B+1 TO C
    STORE RIGHT(TNAME,C) TO FIRST
    STORE B-2 TO D
    STORE SUBSTR(TNAME,1,D) TO LAST
    STORE TRIM(FIRST)+" "+LAST TO NEWNAME
    REPLACE NAME WITH NEWNAME
    SKIP
ENDDO
CLEAR
@ 8, 25 TO 12, 47 DOUBLE
@ 10, 28 SAY "Reversal Complete"
RETURN
```

LISTING 1: REVERSE.PRG, a dBASE program that flips the order of names entered last name first.

Editor's note: To try this program, make a copy of a name-and-address data base (or create one from scratch) containing a character NAME field with data in last-name-first order, and name it XNAMES.DBF. Enter and save REVERSE.PRG. From the dBASE *dot prompt, type* **USE XNAMES <Enter>** *followed by* **DO REVERSE <Enter>**. *Type* **LIST NAME** *to see the results. Don't perform this surgery on your only copy of important data—the changes are permanent.*

WordPerfect Presto Chango

If you frequently change subdirectories in *WordPerfect 5.0*, there's an easy way to return to the previous directory: Just enter a double List Files command by pressing <F5> twice. This logs you on to the previous directory and even restores the original cursor position.

David M. Charles
Oakdale, California

Editor's note: For a demonstration of how to use this time-saving tip, start WordPerfect 5.0. *I'll assume the current directory is C:\WP50. From the document display, press* **<F5>** *and enter a new directory name, such as C:\WORK. When you see WORK's contents, retrieve a file or press <F7> to return to the main document screen. Now, press* **<F5>** *twice. Presto, you're back in C:\WP50! By experimenting, I discovered that selecting option 7 (Other Directory) switches you back to C:\WORK.*

Neatness Counts

Having grown tired of messy disk labels with dates and notes scrawled everywhere, I finally hit on a solution. First, I bought some glue-down photo corners and 3-by-5-inch index cards from an office supply store. Using a blank index card as a positioning guide, I attached four photo corners to the front of my disk

(continues)

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sleeves. Next, I put a fresh label on each disk, with titles like Word Processing #1, Data #2, and so on. I wrote these same titles on the index cards, and then slipped the cards into the corners on the sleeves. Now when I update files or need to add a note about a disk, I jot it on the card instead of the label. When I recycle the disk, I can replace the card without having to peel off the old label. This practice not only eliminated my messy labels, it even forced me to organize my disk collection.

Karen A. Rogers
Santa Rosa, California

Editor's note: And I'll bet your desk is shipshape, too. Seriously, a reusable label is an excellent idea—applying too much pressure when peeling off old disk labels can easily damage fragile floppies.

Busted Pipes

The technique of stringing DOS commands together using a pipe (¦), as Bob Brody suggested in "Pipe Dreams" [*Star-Dot-Star,*

(continues)

DEVELOPER'S TOOLBOX

One Five-Pack to Go, Go, Go

Until I started using Multisoft's *PC-Kwik Power Pak*, I thought I had squeezed every ounce of power from my ALR 386/2. But I was wrong. This collection of five RAM-resident utilities has boosted my system's performance more than I ever dreamed possible.

Built around an intelligent memory manager, *Power Pak* oversees from 64K to 16MB of expanded, extended, or main memory, doling out bytes on demand to a disk cache, a print spooler, a RAM drive, and a display accelerator. The fifth utility, a stand-alone keyboard enhancer, pushes the keystroke-repeat-rate pedal to the metal. By sharing one memory pool, *Power Pak*'s utilities cooperate to put free RAM to the best possible use.

You might think so much power would gobble up main memory. But *Power Pak*'s utilities are amazingly thrifty, taking as little as 10K and never more than 64K (32K on my system). For the extended-memory disk cache buffers, Multisoft recommends an additional 64K to gain a "noticeable improvement" and 128K for an "impressive improvement." I let *Power Pak* take over every smidgen of my system's 1280K extended RAM. The result was an astounding kick in performance.

Installation is totally automated. With no help from me, *Power Pak* determined how much and what kind of memory was in my computer and set its own parameters. This allowed me to start using the utilities immediately. Later on, when I had time to read the manuals, I was able to fine-tune various parameters for top efficiency.

Soon after *Power Pak*'s installation, the wonders began. My hard drive's in-use light, normally more active than a firefly on a summer evening, now flashes only occasionally. I no longer have to wait while lengthy documents print. My display and keyboard zip along like roadsters on high octane. My cursor zooms. And if text flies by too fast to see, I can always press <Scroll Lock>, activating the screen accelerator's ReView feature to retrieve data that has scrolled away.

Of the five utilities, I'm getting the most benefits from the disk cache, which stores previously read disk sectors in RAM, thus reducing disk accesses. For example, one morning I read my MCI Mail, logged on to a Xenix multiuser system, copied files to floppy disks, deleted old backup files, jotted a few notes, and wrote most of this column. After a few hours, I asked *Power Pak* for a status report and discovered that of 4640 disk operations, 3961 read the disk cache rather than the hard disk. The acceleration this produces must be experienced to be believed.

The print spooler is also proving its worth. Unlike the DOS PRINT command, *Power Pak*'s spooler works with any printer and software combination by intercepting characters sent to the serial or parallel output port. The characters are stored in memory and then fed to the printer in the background while you continue working. When the spooler needs more RAM, it borrows memory from the disk cache—a sensible plan that optimizes throughput. To conserve RAM, the spooler compresses text in memory. And according to the manual, you can set up two separate spoolers, which might be useful on systems connected to both a dot matrix and a laser printer.

In these days of megabyte, megabuck software, it's refreshing to find great stuff like *Power Pak*—a set of super utilities for a fair price. They don't come much better than this.

I welcome your comments. My MCI Mail handle is TSWAN; my CompuServe ID is 73627,3241. —*Tom Swan*

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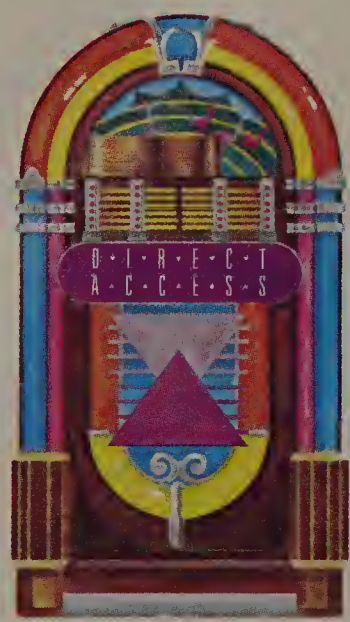

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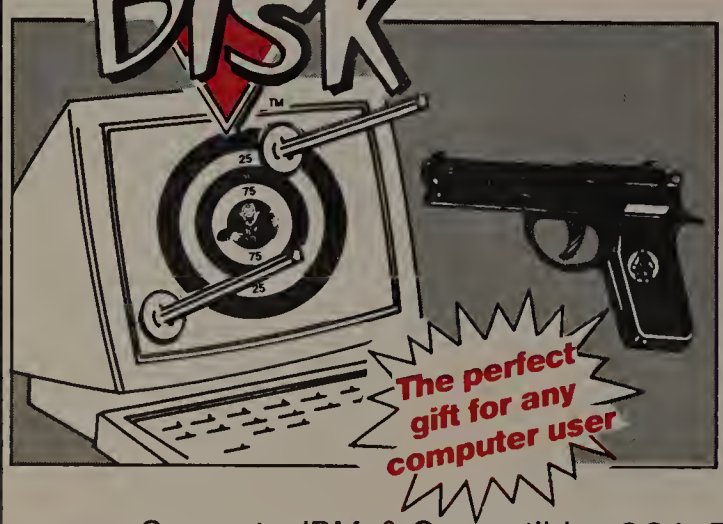

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PCW, May 1989], has at least one major disadvantage when used to load applications. You lose the ability to temporarily exit to DOS from within the running application.

For example, typing CD C:\123 | 123 changes you to the C:\123 directory and runs *1-2-3* without any evident problems. But if you start *1-2-3* this way, exiting temporarily to DOS with the /System command causes DOS to hang. Your only option at this point is to reboot. You can avoid such busted pipe commands by dividing them into separate lines, such as:

```
CD \123
123
```

Kent Akselsen
Tampa, Florida

Editor's note: Mr. Akselsen is correct. This is a whopper of a DOS bug—no doubt the result of COMMAND.COM's attempt to simulate multitasking features like pipes within the confines of a single-tasking operating system. I've yet to find any programs that, when started with a pipe command, still allow you to duck out to DOS. I tried six programs, and they all crashed. If anybody's got the solution to this one, please send it in and we'll print the answer in a future column.

Tom Swan is the author of Mastering Turbo Assembler (Howard W. Sams, Indianapolis, Indiana, 1989) *and the forthcoming* Mastering Turbo Pascal 5.5 *(Howard W. Sams).*

Share your tips and discoveries with PC World *readers; see How to Contact PC World, page 4.* ●

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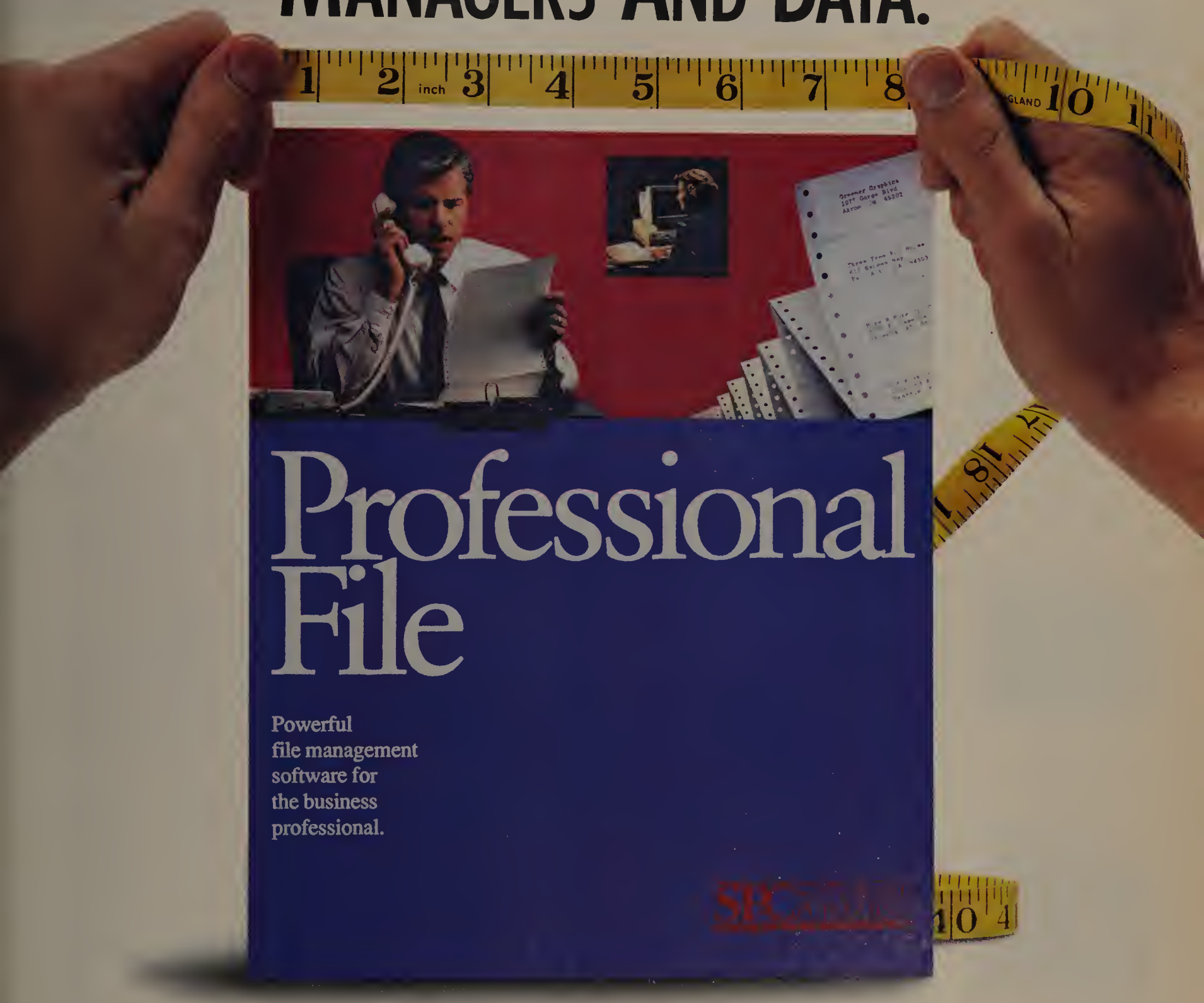

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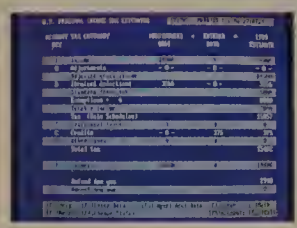

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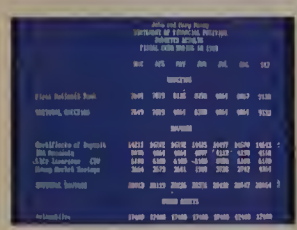

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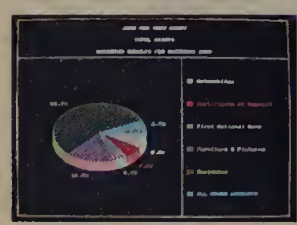

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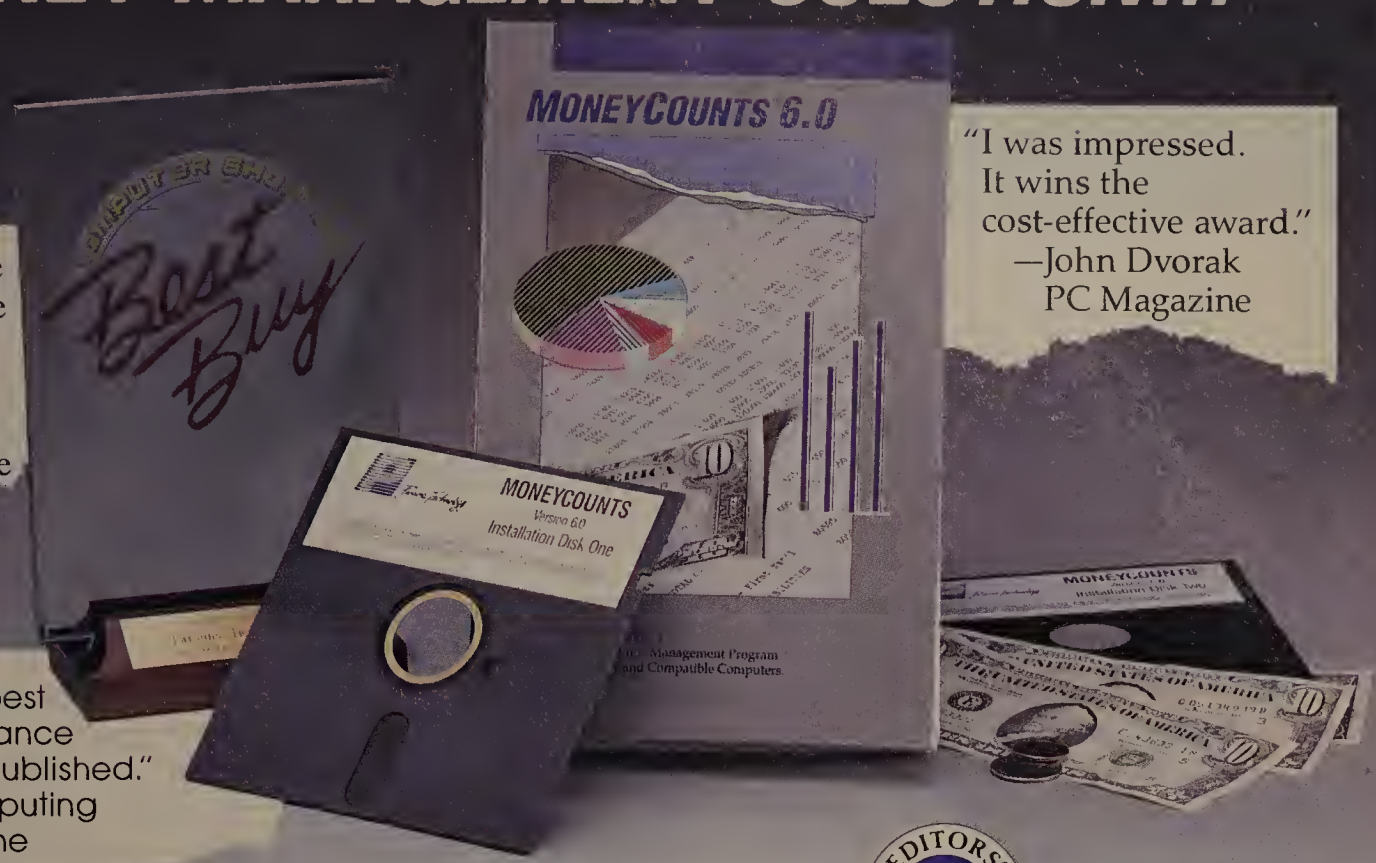

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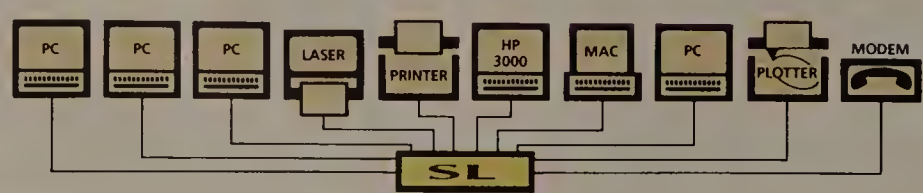

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NETWORK Q&A

Tips and strategies for departmental networking

NetWare 386 versus OS/2 LAN Manager: Do you need one of these powerhouse LAN operating systems? If so, which one?

David Ferris

Q. *Our* NetWare 2.15 *LAN has bulged to 38 nodes, and the performance degradation has gone from noticeable to annoying. Just as we were set to boost performance by moving to* OS/2 LAN Manager, *Novell announced* NetWare 386. *Now what do we do? Is* NetWare 386 *as powerful as* LAN Manager?

Amy Espinoza,
Santa Fe, New Mexico

A. Novell's announcement of *NetWare 386 3.0* (due in the third quarter of 1989) is causing a lot of second-guessing among potential *OS/2 LAN Manager* buyers. Designed to take advantage of the 80386 chip, *NetWare 386* will be more than twice as fast as the current 286-based *NetWare* and should support more than twice as many users. It will also provide greater file capacity and powerful print and security features. Based on early observations, it appears to broadly match the power of *LAN Manager* (see the *NetWare 386* preview, *PCW*, August 1989).

Still, *LAN Manager* may be your best bet. Microsoft sells *LAN Manager* to OEMs, who often add enhancements when they resell it. Versions are available from 3Com, IBM, Ungermann-Bass, InterLAN, Standard Microsystems, Torus, Apricot, and Corvus, and others are due from AT&T, DEC, Hewlett-Packard, NCR, Olivetti, and Tandem. 3Com's *3+Open* is the front-runner, offering sophisticated support for wide area networking (see "Seven Top LANs: A Hard Look at Ease of Use," *PCW*, June 1989).

Why consider *LAN Manager?* First, it's a lot cheaper: $2995 for *3+Open* compared with $7995 for *NetWare 386*. It also offers superior connectivity options. Support from IBM, Microsoft, and other major companies has attracted numerous developers. It's also likely that *LAN Manager* will be required for many future LAN applications.

Both LAN OS's deserve consideration by anyone looking for more speed, security, and flexibility. If you decide on *NetWare 386*, avoid converting until six months to a year after the ship date, so others can iron out the wrinkles. In the meantime, you can boost *NetWare 286* speed by adding server RAM or dedicating a PC as a print server.

What's New in NetWare 386

NetWare 386 has a lot to recommend it—especially for Novell customers. Entirely rewritten for the 80386, it's a superb choice for large, single-server LANs with limited links to other systems. The following outlines some key issues to consider. Where applicable, *NetWare 386* features are compared to *LAN Manager*'s, but this column is not intended as a product review.

Upgrading from NetWare 286. It will be much easier to upgrade to *NetWare 386* than it will be to move to *LAN Manager*. All your *NetWare 286 2.1*x applications (except server-based Value Added Processes, or VAPs) will run without modification. Novell provides a utility that automatically backs up all files, including bindery, security, program, and print queue data; reformats the server; and copies the files back. The catch? The utility works only with *NetWare 2.1* or later versions.

At press time, Novell supported only its proprietary server (sold by Samsung), the Compaq Deskpro 386, and all 386-

(continues)

ANTHONY RUSSO

NetWare 386 Versus 3+Open: Pros and Pros

NetWare 386 and 3+Open (3Com's version of LAN Manager) compete closely in security, print spooling, users per server, storage and memory capacities, installation, and maintenance. However, in some other key areas, each has its advantages.

NetWare 386
- Optimized for 80386 chip (fast performance)
- Easier upgrade from NetWare 286
- Requires less RAM
- Local printer sharing

3+Open
- Easier to link multiple servers
- Low cost
- Numerous links to external systems
- Head start in developer market

based IBM PS/2s. The initial list of supported server adapter boards is limited to Novell Arcnet and Ethernet and IBM Token-Ring. More systems and boards should be supported by the time you read this.

Fortunately, you can use existing *NetWare 2.1* workstation shells and adapters, although you may need to modify the shells slightly and replace some *2.1* utilities. To avoid possible glitches, you can install *NetWare 386*'s new shells, which also take up 65K RAM.

Performance. Since *NetWare 386* takes advantage of the 80386's faster 32-bit instructions and data transfers, it should be two to three times faster than *NetWare 286*. Most likely, it will outpace *LAN Manager*, which is not optimized for the 80386.

Users per server. *NetWare 386* theoretically supports 250 users, up from 100 with the 286 version. Practically, a *NetWare 386* server should support about 80 PCs without noticeable degradation, compared to a typical limit of 40 for *NetWare 286*. *LAN Manager* claims support for 1000, but the real-life limit is closer to that of *NetWare 386*.

Storage and memory. With *NetWare 386*, volume size has increased from 256MB to 32 terabytes, and files can be as large as 4GB. Realistically, the disk limit is more like 2GB to 4GB, but that's still more than enough for the vast majority of LANs. Volumes and files can span as many as 32 physical drives, with a theoretical maximum of 100,000 files open at once. When a file or volume runs out of space, it automatically spills onto another drive.

Novell claims support for up to 4GB of server RAM, but the true-life limit is more like 5MB to 10MB. Yet you can get by with 2MB of RAM instead of the 4MB required by *LAN Manager*.

Print Spooling. Print support now matches *LAN Manager*. Administrators and users are notified of completed jobs, paper outages, and printer errors. And *NetWare 386* has a few tricks of its own. Whereas *LAN Manager* doesn't allow local printers to be shared with other users on the LAN, *NetWare 386* lets users share 16 local printers.

Security. *NetWare*'s security appears to come close to *LAN Manager*'s. Administrators can block access to files instead of just directories. Passwords are now encrypted to guard against snoopers.

Installation and maintenance. *NetWare 386*'s installation process is simplified. To streamline maintenance, you can now install and remove drivers and print queues while the LAN is operating. *NetWare 386* is even self-tuning. To improve performance, it monitors network traffic and automatically adjusts memory assigned to hash tables and buffers.

Applications support. To compete with *LAN Manager* for developer support, Novell is mimicking its rival by publishing its operating system specs. This fall the company will release its application program interfaces (APIs), a common set of subroutines.

Publishing its APIs is a welcome improvement, but compatibility may be a problem. So far, Novell has indicated it will support only 10 *LAN Manager* API calls (Named Pipes, which control interapplication communication) out of a total of 127. Because Novell's set differs from *LAN Manager*'s, many *LAN Manager* applications will have to be rewritten from scratch for *NetWare 386*. It's doubtful that developers will do this, especially for tomorrow's server-based applications.

LAN Manager's Connectivity Edge

Up to this point, *NetWare 386* more or less matches *LAN Manager*. But when you look at connectivity options, *LAN Manager* has the edge.

Linking multiple servers. It's much easier to link multiple

(continues)

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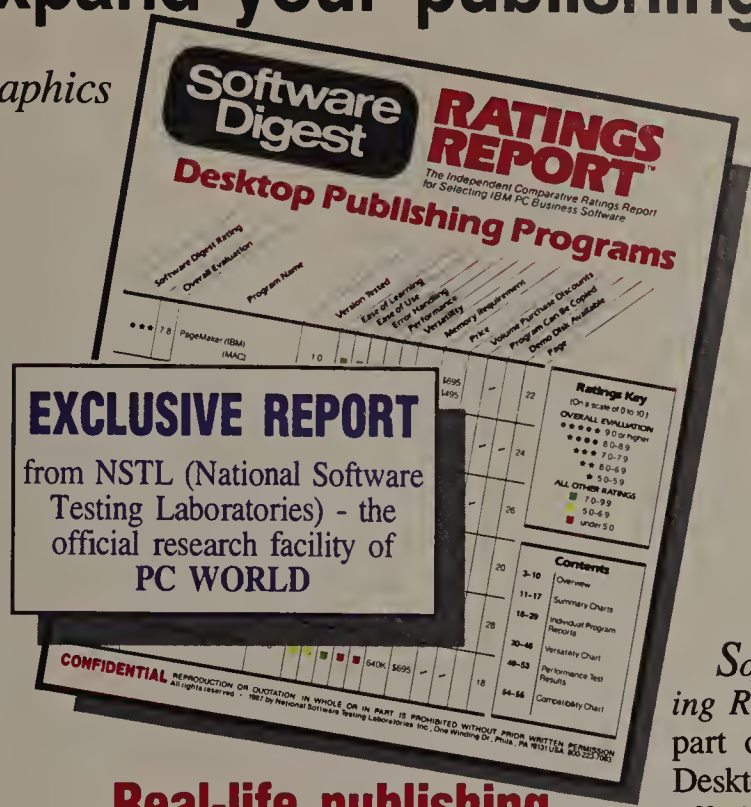

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servers with the top *LAN Manager* version, *3+Open*. With its distributed name service, the program lets you manage multiple servers and other network resources easily from one spot. Because *NetWare 386* lacks this capability, maintaining linked servers is a hassle, requiring synchronization at each server.

External connectivity. *LAN Manager* also has a head start on intersystem connectivity. It provides links to minis, mainframes, and UNIX machines with NetBEUI, XNS, ISO Transport Class 4, and TCP/IP transport protocols. Novell, in contrast, initially will support only its own SPX/IPX transport, and will add Mac support in version 3.1, due in the first quarter of 1990. Other links await subsequent revisions.

The Battle Commences

Thanks to a huge installed base (and what looks to be an excellent 386-specific upgrade), Novell will probably keep most *NetWare* users from migrating to *LAN Manager*. For *NetWare* users who don't need links to other systems, *NetWare 386* is a reasonable choice. However, if forced to choose, I would go with *LAN Manager*. In my opinion, its superior connectivity and support by major vendors make it a better bet for the long term. Most important, if developers choose to support *LAN Manager* (and I think they will), future server-based software will require it.

David Ferris is the president of Ferris Networks, a San Francisco–based PC dealer specializing in networks.

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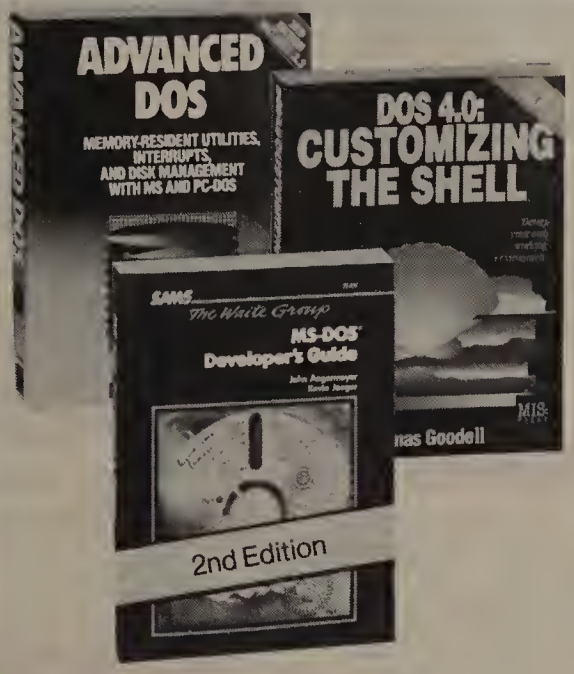

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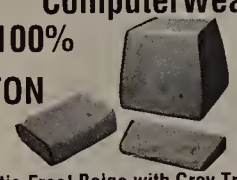

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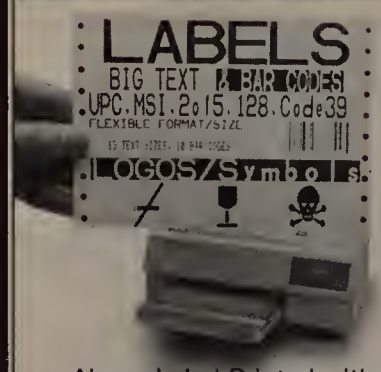

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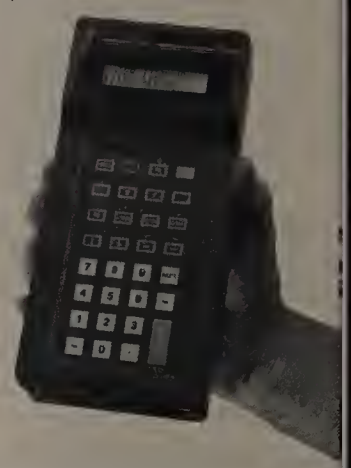

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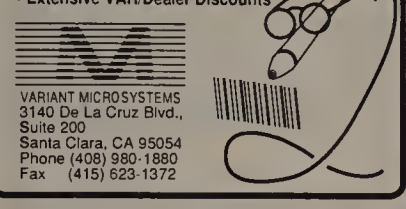

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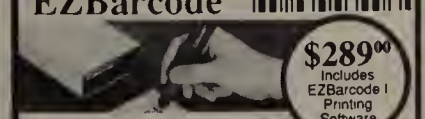

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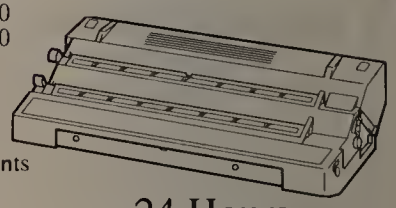

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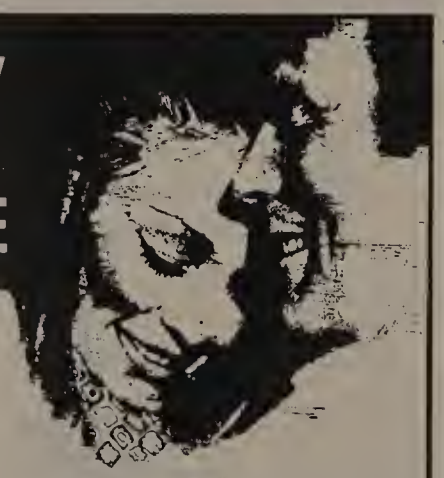

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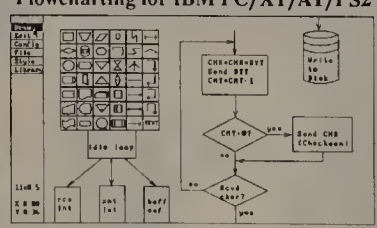

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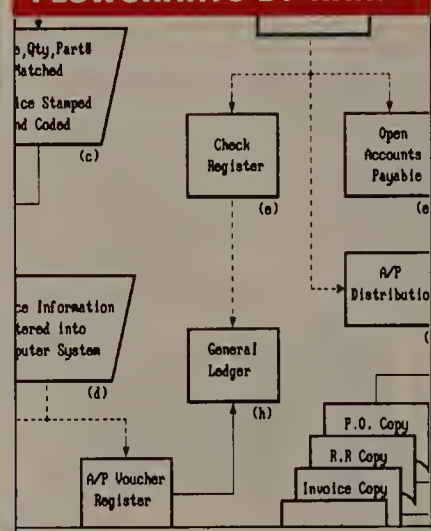

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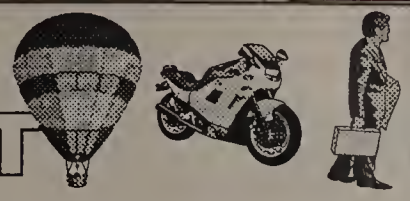

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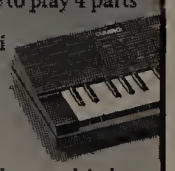

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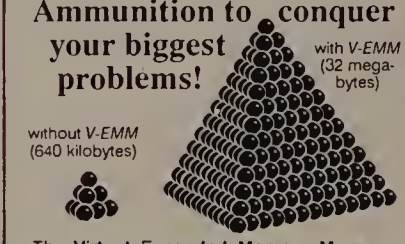

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How can you be *sure* a program will do all it claims? That it will meet your system requirements? That your people will be able to master it?

Shouldn't there be a place to turn for answers? An authoritative and *objective* resource that helps you make the *right* choices, so you can select *exactly* the programs that fit your needs?

There is. It's called *Software Digest*. It's the *single, most trusted resource* for impartial, systematic evaluations of IBM-compatible PC software.

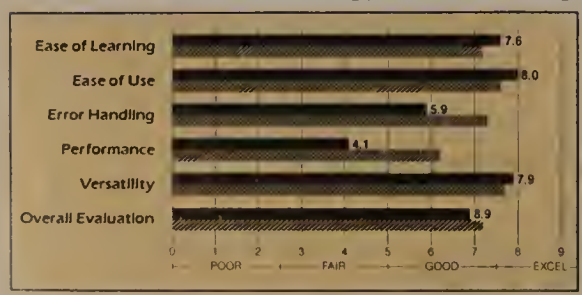
> *"We've recognized the increasing need for performance testing that measures products from a real-world perspective...That's why we have selected* ***National Software Testing Laboratories*** *of Philadelphia, Pa. as the exclusive test facility for all products reviewed in* ***PC World.****"*
>
> **— Richard Landry,** Editor, PC World

The ultimate software reference tool.

Software Digest is the *ultimate* reference source.

It's not for everyone. But if you need to go *beyond* the ads and the reviews...if you require a *higher, deeper level of analysis*...if your work calls for *accurate, comprehensive, scientific* evaluations... then this is the place to turn.

Software Digest has pioneered an original, exclusive methodology for evaluating software. It combines technical testing with practical, "hands-on" sessions involving typical users at all experience levels.



Side-by-side bar charts show how programs score on 5 key test criteria.

Each program is subjected to an exhaustive series of "hands-on" tests by typical computer users at all experience levels.

Under these controlled conditions, we scrutinize each program, and compare all of them head-to-head. Each is tested not just once, but *many times*, under strict rules that ensure consistency and objectivity.

A systematic series of tests measures *ease of learning, ease of use, error handling, versatility, performance* and more.

The result is an absolutely unparalleled set of *comparative ratings* for a wide range of IBM-compatible PC software — including *every* major business application:

✓Spreadsheet programs ✓Databases (multi-user, relational, SQL and file managers) **✓Word processing** (both simplified and advanced) **✓Project management ✓Business graphics ✓Free-form graphics ✓CAD ✓Communications ✓Accounting ✓Desktop publishing ✓Integrated programs ✓Backup systems ✓Local area network software ✓And more**

Couldn't the concrete, research-based data supplied *only* by *Software Digest* help you improve your product selection decisions?

From PC World's official research facility.

Software Digest has a firm policy of accepting *no ads*. We are 100% subscriber-supported. That gives us the freedom to be *fully objective and unbiased* in our product evaluations.

Without vested interests of *any* kind, we can be *totally* impartial. We're free to print *exactly* what our tests reveal — and we don't pull our punches. We tell the *whole* truth — and let the chips fall where they may.

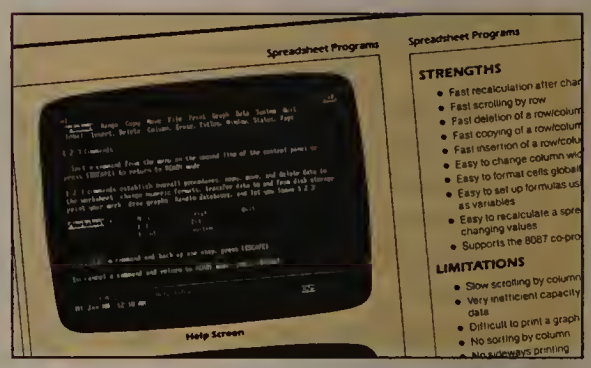
Last year, *PC World* selected us as their official testing facility.

In a major editorial in the October 1987 issue, *PC World* Chairman David Bunnell commented: *"NSTL has the reputation for undertaking the most comprehensive performance and versatility tests of hardware and software products in our industry.... They're going to tell it like it is — not sell it like it is."*

Monthly "Buyer's Alert" keeps you on top.

Another important plus: We monitor the fast-changing software marketplace for you on an *ongoing* basis.

Each issue of *Software Digest* includes *Buyer's Alert*. This useful monthly supplement covers program upgrades and enhancements, performance testing updates, previews of new products we're evaluating ...and much more.



Each program receives its own detailed two-page report.

Users applaud *Software Digest*'s graphic format. Test results are *clear, readable* and *accessible*. You can see *instantly* how competing programs stack up against each other.

Perhaps most important, *everything you need to know is in one place*. So you don't have to plow through stacks of material searching for answers.

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>
> **— Richard Concaildi,** Dearborn Chemical Co.,Lake Zurich, Ill.

How long would it take you and your staff to match this kind of research and analysis? How much would it cost?

Imagine the investment in time, money, effort, manpower! To test just *one category* of software for a typical issue of *Software Digest* requires 3,000 man-hours and an expenditure of $50,000.

will meet your needs . . . trouble?

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Warning! The personal computer environment is changing *faster* than *ever* before. The pressures will intensify. Will you be prepared?

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>
> — **L.J. Callaghan**, Nabisco, Hanover, N.J.

Right now, a new generation of software is evolving. New programs — and *changes* to existing programs — will appear at an accelerating pace. OS/2 will soon be baseline technology — and generate a host of new applications. The 386 machines will accelerate the proliferation of software choices.

Today, with DP budgets tighter, with the new emphasis on documenting computer productivity and bottom-line payoff, you'll be required to *justify* your purchasing decisions more than *ever* before.

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DATA ENTRY FORMS											
Maximum forms per table	U	1	A96	U	U	U	A80	1	U	10	U
Maximum screens per form	2	16	15	Y	A42	15	15	1	5	15	U
User-specified field placement	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Text placed anywhere on screen	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
VALIDATION											
Lookup validation		✓		P	P	✓	✓	✓	✓	P	
Lookup in another table		✓		P	P	✓	✓	✓	✓	P	
Range checking	✓	✓		✓	P	✓	✓	✓	✓	✓	
Validate by mathematical expression		✓		P	P				✓	P	
Date checking	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Time checking		✓		P					✓	✓	

Which programs have the capabilities you want? Each feature is methodically verified by our technicians.

Thousands of DP managers, MIS directors, PC coordinators, small business owners and independent consultants rely on *Software Digest* to make the *right* choices, increase productivity, minimize risks.

Isn't it time you joined them — and armed yourself with the kind of vital intelligence you won't find *anywhere* else?

Software Digest Rating	Overall Evaluation	Program Name	Version Tested	Ease of Learning	Ease of Use	Error Handling	Performance	Versatility	Memory Requirement	Price	Volume Purchase D	Program Can Be Copied	Demo Disk Available	Page
File Managers														
★★★★	8.0	O&A	pre-3 0 2.0	■	■	■	■	■	512K	$349	✓	✓	✓	28
★★★	7.7	PFS.Professional File	1 01	■	■	■	■	■	256K	$249	✓	✓	✓	22
★★★	7.2	PowerBase	2 3	■	■	■	■	■	384K	$349	✓	✓		24
★★	6 4	RapidFile	1.0	■	■	■	■	■	256K	$295	✓	✓	✓	30
★★	6.3	Nutshell Plus	1.0	■	■	■	■	■	384K	$295	✓	✓	✓	18

Master Ratings Chart on each issue's front cover compares every program at a glance.

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Make no mistake: No other PC resource is as complete, as reliable, or as universally trusted as *Software Digest*. That's why we call it "the ultimate software reference tool."

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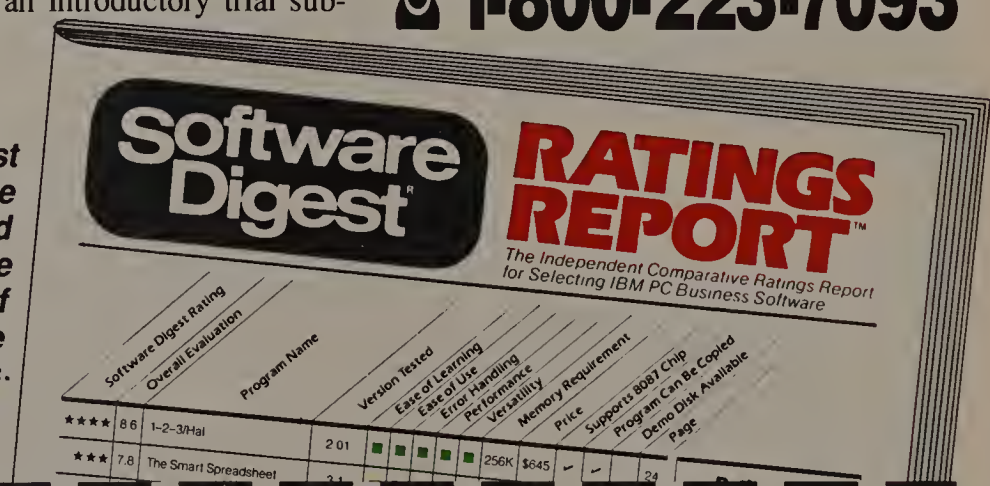

> *Good cost comparisons! Our accounting group was going to buy a $1500 financial planning package. Your evaluations showed them a better package for only $875.*
>
> — **Tim Belt**, Kenworth Truck Co., Chillicothe, Ohio

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Microsoft Serial or Bus	94
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Quick Pascal	60

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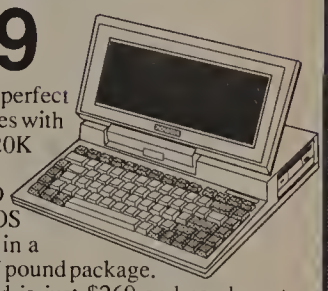

The T1000 is the perfect second PC! It comes with 512K of Ram, a 720K floppy drive, a supertwist LCD screen and MS-DOS in ROM! All this in a battery-powered 7 pound package. A 768K Ram card is just $269 and can be set as base, expanded, or a non-volitile Ram disk.

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FoxBASE+

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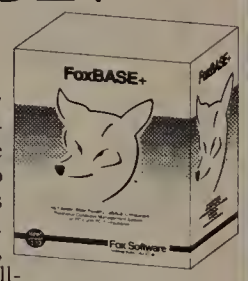
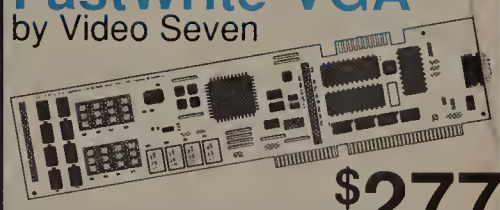


FoxBase+ 2.10 is simply the fastest dBASE compatible database software available. FoxBase+ also adds many enhancements to the dBASE language. And it's user-friendly too, its FoxCentral uses pull-down and pop-up menus and you can perform every important database operation without programming! There are even LAN, runtime, and 386 versions available.

FastWrite VGA

by Video Seven



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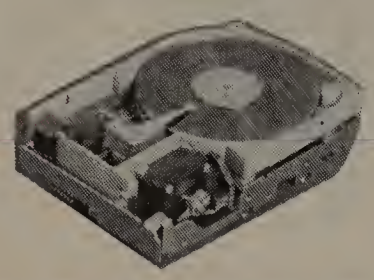

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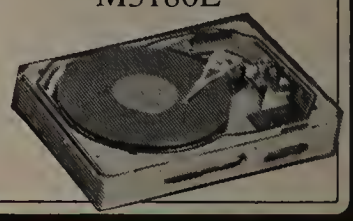

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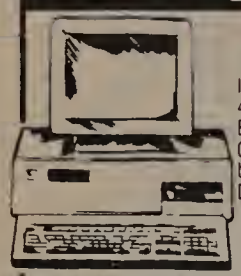

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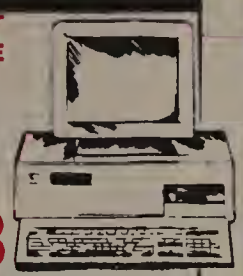

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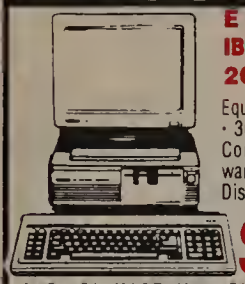

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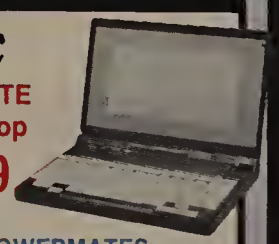

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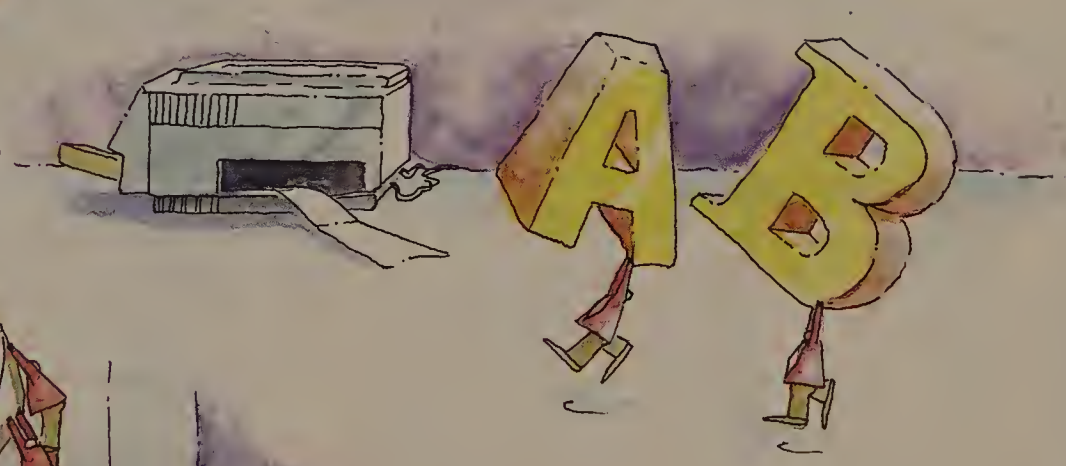

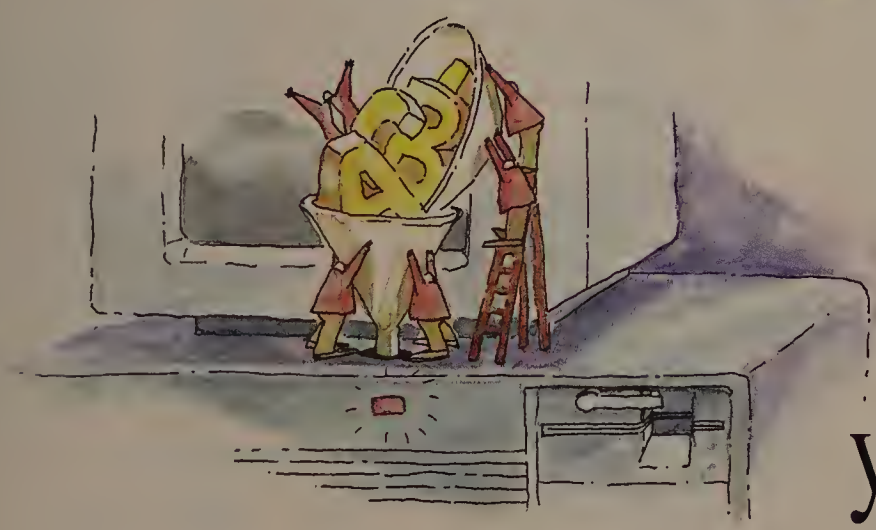

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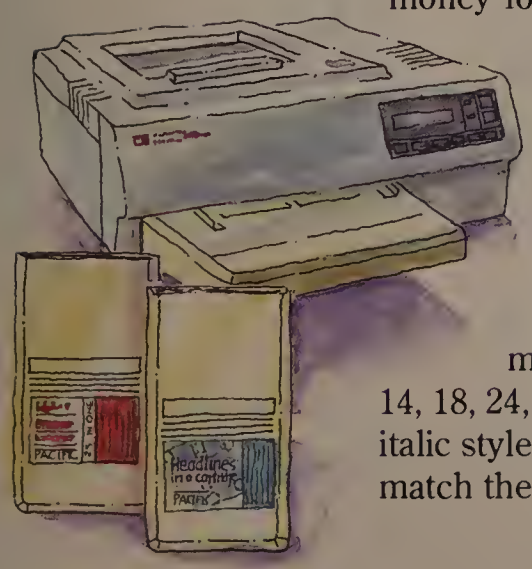

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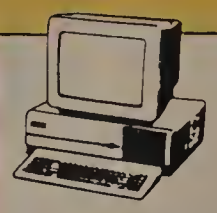

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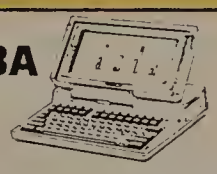

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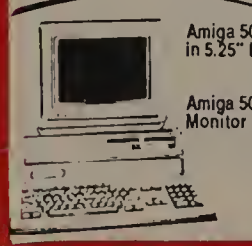

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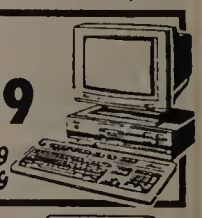

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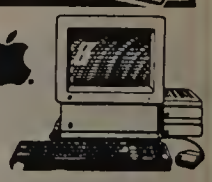

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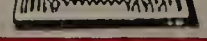

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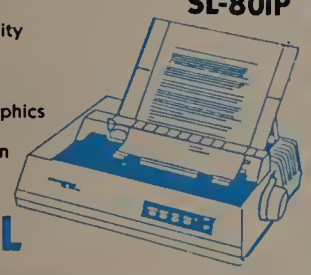

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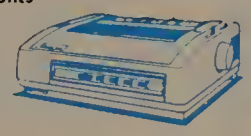

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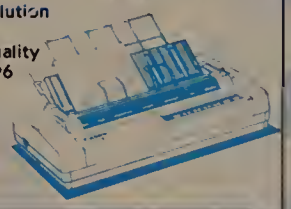

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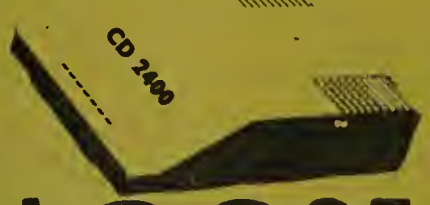

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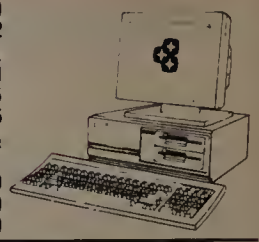

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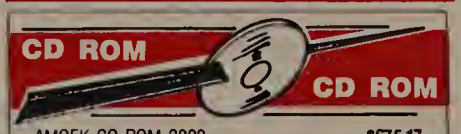

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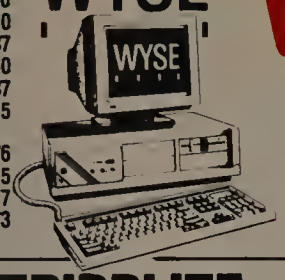

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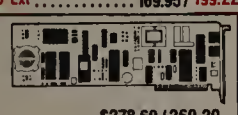

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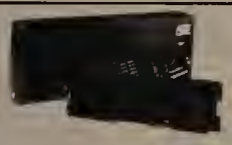

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Why Change What Works?

Hal DuPrie

The *ZIP* versus *ARC* controversy raises yet another user dilemma.

Should *ZIP* replace *ARC* as your electronic bulletin board's file-compression utility of choice? I think not, and here's why.

There are many good programs that compress and uncompress files so BBS users can save time and phone charges when downloading software, but *ARC* from System Enhancement Associates (SEA) has become the de facto standard.

The controversy over BBS compression programs arose when developer Phil Katz distributed a competing program called *PKARC*. SEA sued Katz and succeeded in getting him to take *PKARC* off the market and stop marketing programs with "ARC" in the name.

Now Katz has developed a compression program called *ZIP*, and some BBS system operators are starting to use it. *ZIP*'s compression ratio is admittedly slightly better than *ARC*'s—by 5 to 10 percent—and the program is faster than *ARC*. The problem is, it's inefficient to maintain files on a bulletin board in more than one format. Before this controversy, users needed only *ARC* to access the whole world of BBS software. Now they must keep track of at least two compression programs and formats—a real problem for novices.

Bulletin boards are accessed by users of many machines and operating systems: *ARC* is available for CP/M, DOS, UNIX, XENIX, Atari ST, Tandy, Commodore, Amiga, Apple, VAX VMS, and many other popular operating systems. *ZIP* is available for DOS; I know of no other implementations. Score: *ARC* 1, *ZIP* 0.

For those wishing to implement the program on yet another system, the *ARC* source code is available free; the source code for *ZIP* is not. Score: *ARC* 2, *ZIP* 0.

ARC is reliable. It's had several years of extensive use, whereas *ZIP* is new, and bugs are bound to remain. Since this is not unreasonable for new code, I won't count it against the program. But it should be of concern to heavy users of *ZIP*.

As I mentioned, *ZIP* does produce smaller files than *ARC*. But a user of several bulletin board systems would need copies of both programs, and together they would probably take up more space than the savings from using *ZIP*. To be fair, though, this one goes to *ZIP*. Score: *ARC* 2, *ZIP* 1.

ARC's backward compatibility is proven, while *ZIP* is compatible only with itself. Since the program is new, a user must consider any claims about future backward compatibility to *PKARC* and *PKXARC* as just that—claims. Score: *ARC* 3, *ZIP* 1.

Moreover, I find *ARC* more user-friendly than *ZIP*. I feel comfortable with *ARC*, uneasy with *ZIP*. Perhaps this is unfair, but at least it's honest. Score: *ARC* 4, *ZIP* 1.

Finally, I see *ARC* as the IBM of compression programs: It will be around for a long time and support will be available. New programs, such as *ZIP*, will continue to be introduced, and each will do something slightly better than *ARC* does. But *ARC* will also continue to improve and will ultimately remain the de facto standard.

It may not be the hottest thing since sliced bread, but *ARC* endures, and I've got good reasons to stick with it. ●

Hal DuPrie is a system operator who hosts the Boston Metro Net 101 on FidoNet.

Have a different perspective? Write Dan Lavin, User Ombudsman, PC World, *501 Second St., San Francisco, CA 94107.*

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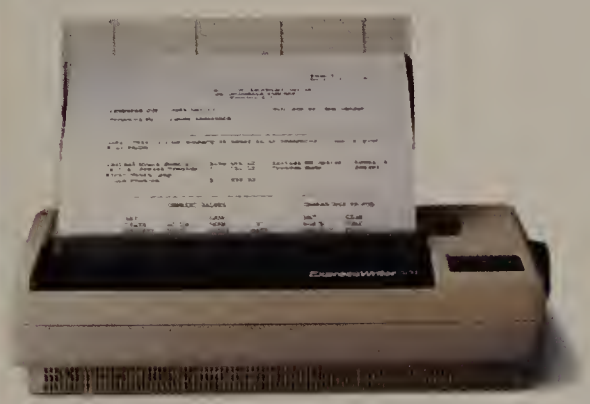

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